

CURRICULUM VITAE

JOHN H. BRADFORD

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EDUCATION

Ph.D. Geophysics, January 1999, Rice University, Houston, Texas
B.S. Physics, 1994, University of Kansas, Lawrence, Kansas
B.S. Engineering Physics (*concentration in chemical engineering*), 1994, University of Kansas, Lawrence, Kansas

PROFESSIONAL EXPERIENCE

Professor, Boise State University, Boise, ID (8/11-present)
Associate Professor, Boise State University, Boise, ID (8/08 - 8/11)
2nd Vice President, Society of Exploration Geophysicists (10/09-10/10)
Director, Center for Geophysical Investigation of the Shallow Subsurface (1/06-1/09)
Assistant Professor, Boise State University, Boise, ID (8/05 - 7/08)
Research Professor, Boise State University, Boise, ID (6/01 - 8/05)
Academic Professional Research Scientist, Univ. of Wyoming, Laramie, WY (4/99 - 6/01)

AWARDS AND HONORS

Harold Mooney Award, Near Surface Geophysics Section, SEG, 2010
Top 4 paper, SAGEEP 2009, invited to present at 2009 EAGE NSG mtg in Dublin, Ireland
Named one of Houston's best and brightest: Technology Houston, 1999
Torkild Rieber Award for academic excellence in geology, Rice University, 1998
Schlumberger Fellowship (not accepted), Rice University, 1997
Samuel P. Worden Endowed Award for innovation in geophysics, Rice University, 1997
U.S. EPA STAR Graduate Fellow, 1995-1997
Outstanding Senior in Physics, University of Kansas, 1994
Outstanding Senior in Engineering Physics, University of Kansas, 1994
Stranathan Award for Outstanding Junior in Physics, University of Kansas, 1993

GEOPHYSICS COMMUNITY SERVICE

Associate Editor, *Near Surface Geophysics*, (10/09 - present)
Associate Editor, *Geophysics*, (1/05 - 12/08)

GRADUATE STUDENTS

Joel Brown, PhD Candidate, Boise State University
Emily Hinz, PhD Candidate, Boise State University
Emily Park, MS Candidate, Boise State University
Shannon Murray, PhD Aspirant, Boise State University
Jake Deeds, MS 2002, University of Wyoming
Scott Hess, MS, 2006, Boise State University
Troy Brosten, PhD 2008, Boise State University
Josh Nichols, MS 2010, Boise State University

PEER REVIEWED PUBLICATIONS

(* - indicates student first author, ** - indicates invited paper)

- *Brown, J., Harper, J., Pfeffer, W.T., Humphrey, N., Bradford, J., 2010, High resolution study of layering within the percolation and soaked facies of the greenland icesheet, *Annals of Glaciology*.
- *Hinz, E.A, and J.H. Bradford, 2010, Ground-penetrating radar reflection attenuation tomography with an adaptive mesh: *Geophysics*, 75, WA251–WA261, doi: 10.1190/1.3467874.
- Harper, J.T., Bradford, J.H., Humphrey, N.F., and Meierbachtol, T.W., 2010, Vertical extension of the subglacial drainage system into basal crevasses: *Nature*, 467, 579-582, doi:10.1038/nature09398.
- Bradford, J.H., Dickins, D.F., and Brandvik, P.J., 2010, Assessing the potential to detect snow covered oil spills on sea ice using ground-penetrating radar: *Geophysics*, 75, G1-G12, doi: 10.1190/1.3312184.
- Martin, A.J., Wyld, S.J., Wright, J.E., Bradford, J.H., 2009, The Lower Cretaceous King Lear Formation, northwest Nevada: Implications for Mesozoic orogenesis in the western U.S. Cordillera: *Geological Society of America Bulletin*, doi:10.1130/B26555.1.
- *Brosten, T.R., Bradford, J.H., McNamara, J.P., Gooseff, M.N., Zarnetske, J.P., Bowden, W.B., and Greenwald-Johnston, M.E., 2009, Estimating 3D variation in active-layer thickness beneath arctic streams using ground-penetrating radar: *Journal of Hydrology*, 373, 479-486
- *Hess, S., Fairley, J.P., Bradford, J.H., Lyle, M., Clement, W., 2009, Evidence for composite hydraulic architecture in an active fault system based on 3D seismic reflection, time-domain electromagnetics, and temperature data: *Near Surface Geophysics*, 7, 341-352.
- Bradford, J.H., Harper, J.T., and Brown, J., 2009, Complex dielectric permittivity measurements from ground-penetrating radar data to estimate snow liquid water content in the pendular regime: *Water Resources Research*, 45, W08403, doi:10.1029/2008WR007341.
- *Brown, J.M., Harper, J.T., Bradford, J.H., 2009, A radar transparent layer in a temperate valley glacier: Bench Glacier, Alaska: *Earth Surface Processes and Landforms*, 34, 1497-1506.
- *Brosten, T.R., Bradford, J.H., McNamara, J.P., Gooseff, M.N., Zarnetske, J.P., Bowden, B.W., Johnston, M.E., 2009, Multi-offset GPR methods for hyporheic zone investigations: *Near Surface Geophysics*, 7, 244-257..
- *Brown, J., Nichols, J., Steinbronn, L., and Bradford J., 2009, Improved GPR interpretation through resolution of lateral velocity heterogeneity: Example from an archaeological site

- investigation: *Journal of Applied Geophysics*, 68, 3-8, doi:10.1016/j.jappgeo.2008.08.014.
- Bradford, J.H., Nichols, J., Mikesell, D., Harper, J., 2009, Continuous profiles of electromagnetic wave velocity and water content in glaciers: an example from Bench Glacier, Alaska, USA: *Annals of Glaciology*, 50(51), 1-9.
- **Bradford, J.H., Clement, W., and Barrash, W., 2009, Estimating porosity with ground-penetrating radar reflection tomography: A controlled 3D experiment at the Boise Hydrogeophysical Research Site: *Water Resources Research*, 45, W00D26, doi:10.1029/2008WR006960.
- *Meierbachtol, T.W., Harper, J.T., Humphrey, N.F., Bradford, J.H., Shaha, J., 2008, Air compression as a mechanism for the underdamped slug test response in fractured glacier ice: *Journal of Geophysical Research (Earth Surface)*, 113, F04009, doi:10.1029/2007JF000908.
- **Bradford, J.H., Dickins, D.F., and Liberty, L.M., 2008, Locating oil spills under sea ice using ground-penetrating radar: *The Leading Edge*, 27, 1424-1435.
- Gooseff, M.N., Payn, R.A., Zarnetske, J.P., Bowden, W.B., McNamara, J.P., and Bradford, J.H., 2008, Comparison of in-channel mobile-immobile zone exchange during instantaneous and constant rate stream tracer additions: Implications for design and interpretation of non-conservative tracer experiments: *Journal of Hydrology*, 357, 112-124.
- *Payn, R.A., Gooseff, M.N., Benson, D.A., Cirpka, O.A., Zarnetske, J.P., Bowden, W.B., McNamara, J.P., and Bradford, J.H., 2008, Comparison of instantaneous and constant-rate stream tracer experiments through non-parametric analysis of residence time distributions: *Water Resources Research*, 44, W06404, doi:10.1029/2007WR006274.
- *Greenwald, M.J., Bowden, W.B., Gooseff, M.N., Zarnetske, J.P., McNamara, J.P., Bradford, J.H., and Brosten, T.R., 2008, Hyporheic exchange and water chemistry of two Arctic tundra streams of contrasting geomorphology: *Journal of Geophysical Research (Biogeosciences)*, 113, G02029, doi:10.1029/2007JG000549.
- Bowden, W., M. Gooseff, J. H. Bradford, A. Balsler, A. Green, and B. J. Peterson. 2008. Sediment and nutrient delivery from thermokarst features in the foothills of the North Slope, Alaska: Potential impacts on headwater stream ecosystems: *Journal of Geophysical Research (Biogeosciences)*, 113, G02026, doi:10.1029/2007JG000470.
- **Bradford, J.H., 2008, Measuring water content heterogeneity using multi-fold GPR with reflection tomography: *Vadose Zone Journal*, 7, 184-193, doi:10.2136/vjz2006.0160.
- *Zarnetske, J.P., Gooseff, M.N., Bowden, W.B., Greenwald, M.J., Brosten, T.R., Bradford, J.H., and McNamara, J.P., 2008, Influence of morphology and permafrost dynamics on hyporheic exchange in Arctic headwater streams under warming climate conditions: *Geophysical Research Letters*, 35, L02501, doi:10.1029/2007GL032049.
- Bradford, J. H., C. R. Johnson, T. R. Brosten, J. P. McNamara, and M. Gooseff, 2007, Imaging thermal stratigraphy in fresh water lakes using georadar. *Geophysical Research Letters*, 34, L24405, doi:10.1029/2007GL032488.
- Bradford, J.H., and Wu, Y., 2007, Instantaneous spectral analysis: Time-frequency mapping via wavelet matching with application contaminated site characterization by 3D GPR: *The Leading Edge*, 26, 1018-1023.
- *Zarnetske, J.P., Gooseff, M.N., Brosten, T.R., Bradford, J.H., McNamara, J.P., and Bowden, W.B., 2007, Transient storage as a function of geomorphology, discharge, and permafrost active layer conditions in arctic tundra streams: *Water Resources Research*,

doi:10.1029/2005WR004816.

- Bradford, J.H., 2007, Frequency dependent attenuation analysis of ground-penetrating radar data: *Geophysics*, 72, J7-J16.
- *Brosten, T.R., Bradford, J.H., McNamara, J.P., Zarnetske, J.P., Gooseff, M.N., Bowden, W.B., 2006, Profiles of temporal thaw depths beneath two arctic stream types using ground-penetrating radar: *Permafrost and Periglacial Processes*, 17, 341-355.
- **Bradford, J.H., Liberty, L.M., Lyle, M.W., Clement, W.P., and Hess, S., 2006, Case History: Imaging complex structure in shallow seismic-reflection data using pre-stack depth migration: *Geophysics*, 71, B175-B181.
- Bradford, J.H. and Deeds, J.C., 2006, Ground-penetrating radar theory and application of thinbed offset-dependent reflectivity: *Geophysics*, 71, K47-K57.
- Bradford, J.H., 2006, Applying reflection tomography in the post-migration domain to multi-fold ground-penetrating radar data: *Geophysics*, 71, K1-K8.
- Bradford, J.H., and Harper J.T., 2005, Wavefield migration as a tool for estimating spatially continuous radar velocity and water content in glaciers: *Geophysical Research Letters*, 32, L08502
- Bradford, J.H., McNamara, J.P., Bowden, W., and Gooseff, M.N., 2005, Measuring thaw depth beneath peat-lined arctic streams using ground-penetrating radar: *Hydrological Processes*, 19, 2689-2699.
- Harper, J.T., and Bradford, J.H., 2003, Snow stratigraphy over a uniform depositional surface: Spatial variability and measurement tools: *Cold Regions Science and Technology*, 37, 289-298.
- Bradford, J.H., 2002, Depth characterization of shallow aquifers with seismic reflection - Part I: The failure of NMO velocity analysis and quantitative error prediction: *Geophysics*, 67, 89-97.
- Bradford, J.H., and Sawyer, D.S., 2002, Depth characterization of shallow aquifers with seismic reflection - Part II: Pre-stack depth migration and field examples: *Geophysics*, 67, 98-109.
- Bradford, J.H., Sawyer, D.S., Zelt, C.A., and Oldow, J.S, 1998, Imaging a shallow aquifer in temperate glacial sediments using seismic reflection profiling with DMO processing: *Geophysics*, 63, 1248-1256.

PEER REVIEWED BOOK CHAPTERS

- Haney, M.M., Decker, K.T., Bradford, J.H., 2010, Group velocity and permittivity structure derived from guided GPR pulses: in Miller, R.D, Bradford, J.H., Holliger, K., eds., *Advances in Near Surface Seismology and Ground-Penetrating Radar*, Society of Exploration Geophysicists, Tulsa, OK.
- Bradford, J.H., 2010, Integrated hydrostratigraphic interpretation of 3D seismic reflection and pseudo 3D ground-penetrating radar data: in Miller, R.D, Bradford, J.H., Holliger, K., eds., *Advances in Near Surface Seismology and Ground-Penetrating Radar*, Society of Exploration Geophysicists, Tulsa, OK.

MAGAZINE ARTICLES

- Bradford, J.H., 2010, SEG President's Page: The role of technical sections within the SEG: *The Leading Edge*, 29(8), 888.
- Bradford, J.H., 2010, SEG President's Page: What does it mean to be an international society?:

EDITED BOOKS

Miller, R.D., Bradford, J.H., and Holliger, K., eds., 2010, Advances in near surface seismology and ground-penetrating radar: Society of Exploration Geophysicists, Tulsa, OK.

CURRENT AND PAST FUNDED RESEARCH GRANTS AND CONTRACTS

- Co. P.I. "Remote Sensing of the Cryosphere: Calibration and Validation", NASA EPSCoR, 9/1/10-8/31/13, Marshall, H.P., Bradford, J.H., van Wijk, K., McNamara, J., Flores, A., **(\$749,938)**
- Co. P.I. "Quantifying lateral flow of water on alpine slopes using high resolution geophysical techniques", NSF Hydrology, 3/1/10-2/28/13, Marshall, H.P., Bradford, J.H., McNamara, J., **(\$228, 963)**
- Co. P.I. "Detecting oil on and under sea ice using ground-penetrating radar: Proposal for developing a new airborne system", DF Dickins Assoc. Ltd., Marshall, HP, Bradford, JH, 11/20/09 - 10/15/11, **(\$206,000)**
- Co. P.I. "Measuring and Modeling Hydrologic Fluxes and States from Aquifer to Atmosphere at Multiple Scales", Army Research Office, Environmental Sciences Division; Barrash, W.B., Flores, A., Bradford, J.H., Malama, B., McNamara, J., Howington, S., Illangasekare, T., Hubbell, J., 8/3/09-8/2/12, **(\$665,880)**
- Lead P.I. "GPR Survey of Hailey Cemetery", Blaine County, Idaho; Bradford, J.H., 7/13/09-10/31/09, **(\$13,856)**
- Lead P.I. Detection of Oil on and Under Ice – Phase III: Evaluation of Higher-Powered Airborne Radar Systems to Detect Oil Under Ice and Field Testing Existing Technology to Map Oil Under Snow, U.S. Department of Interior, Mineral Management Services (Subcontract to D.F. Dickins and Assoc. Ltd.); Bradford, J.H., 11/1/06-10/31/07, **(\$85,330)**
- Co P.I. Time-lapse 3D GPR characterization and monitoring of near-surface groundwater and contaminant flows: Phase II, DOE Small Business Innovation Research Program; Collaborative proposal with 4th Wave Imaging Inc. and CGISS, 9/06 - 8/08, **(\$199,920)**
- Lead P.I. 2006 Field Spill to Test: New and Innovative Equipment and Technologies for the Remote Sensing, Detection and Tracking of Oil in and Under Ice, U.S. Department of Interior, Mineral Management Services (Subcontract to D.F. Dickins and Assoc. Ltd.); Bradford, J.H., 11/1/05-11/15/06, **(\$73,666)**
- Co P.I. A site survey in support of IODP drilling proposal 626-Full "Cenozoic Pacific equatorial age transect: Following the paleo-equator", National Science Foundation Ocean Drilling Program; Lyle, M., Lyle, A., Bradford, J., 9/05 - 8/08, **(\$470,918)**
- Co P.I. Time-lapse 3D GPR characterization and monitoring of near-surface groundwater and contaminant flows, DOE Small Business Innovation Research Program; Collaborative proposal with 4th Wave Imaging Inc. and CGISS, 6/05 - 6/06, **(\$100,000)**
- Lead P.I. Collaborative Research: Water storage and routing within glaciers via planar voids, a new model of glacier hydrology, National Science Foundation; Bradford, J., Clement, W., Harper, J. Humphrey, N., 3/1/05-2/28/08, **(\$297,826)**

- Co P.I. New and innovative equipment and technologies for the remote sensing and surveillance of oil in and under ice, U.S. Department of Interior, Mineral Management Services (Subcontract to D.F. Dickins and Assoc. Ltd.); Bradford, J.H., Liberty, L., 9/1/04-8/30/05, **(\$39,977)**
- Lead P.I. Utilizing Ground-Penetrating Radar and Solute Tracer Experiments to Determine the Extent of the Hyporheic Zone in Mountain Streams, USDA National Research Initiative; Bradford, J.H., Gooseff, M.N., McNamara, J., 9/1/04-8/30/06, **(\$89,090)**
- Lead P.I. Imaging shallow stratigraphy and bedrock at Tamarack Resort using shallow seismic reflection, HydroLogic, Inc., Bradford, J., Liberty, L., 4/29/04 - 6/30/04, **(\$34,500)**
- Co P.I. Will climate change effect hyporheic processes in Arctic streams? An assessment of interactions among geomorphology, hydrology, and biochemistry in Arctic stream networks, National Science Foundation; Bowden, W., Gooseff, M., McNamara, J., Bradford, J.H., 8/1/03-7/31/06 **(\$608,708)**
- Lead P.I. Material property estimation for direct detection of DNAPL using integrated ground-penetrating radar velocity, imaging, and attribute analysis, U.S. Department of Energy; Bradford, J.H., Smithson, S.B., and Holbrook, W.S., 9/15/99-9/14/04 **(\$648,308)**
- Lead P.I. Characterizing shallow aquifers using geophysical methods, 1995, U.S. EPA STAR graduate fellow program, August 1995 - August 1997, Bradford, J.H., **(\$68,000)**

INVITED LECTURES

- "Integrated analysis of seismic refraction and GPR data for estimation of soil moisture and porosity", American Geophysical Union, 2010 Fall Meeting, San Francisco, 12/2010
- "Non-linear attenuation analysis of FMCW radar data for soil property characterization", American Geophysical Union, 2010 Fall Meeting, San Francisco, 12/2010
- "International Collaboration and Scientific Societies: Observations from the SEG", American Geophysical Union, 2010 Meeting of the Americas, Iguassa Falls, Brazil, 8/2010
- "Locating LNAPL contamination in the field using GPR velocity anomalies: Examples from Hill AFB, Utah, USA", 4th International Conference on Environmental and Engineering Geophysics, Chengdu, China, 6/2010
- "Acquisition, Processing, and Analysis of Continuous Multi-Offset GPR Data for Problems in Hydrogeophysics: Is it Worth the Cost?", American Geophysical Union, 2009 Fall Meeting, San Francisco, 12/2009
- "Estimating Debye parameters from GPR reflection data using spectral ratios", European Association of Geoscientists and Engineers, Near Surface 2009, Dublin, Ireland, 9/2009.
- "Detecting oil in ice and snow with ground-penetrating radar", United States and Canada northern oil and gas research forum: Current status and future directions in the Beaufort Sea, North Slope and Mackenzie Delta, Anchorage, AK, 10/08.
- "Ground-penetrating radar for characterization of shallow groundwater systems", National Groundwater Association Groundwater Exp and Annual Meeting - 2007, Orlando, FA, 12/07.
- "Developments with ground penetrating radar to detect and map oil trapped under ice", International Oil and Ice Workshop - 2007, Anchorage, AK, 10/07.

- “Advanced processing and acquisition to image within and beneath shallow water bodies with ground-penetrating radar”, 2007, EAGE workshop on high resolution geophysics for shallow water, London, UK.
- “Imaging the subsurface with ground-penetrating radar: An introduction”, 2007, Idaho Museum of Mining and Technology, Boise, ID.
- “Imaging Beneath and Within Shallow Water Bodies using Ground-Penetrating Radar”, 2007, Department of Geological Sciences, University of Idaho.
- “Acquisition and Processing of Multi-Fold Ground Penetrating Radar Data for Characterization of Contaminated Groundwater Systems”, 2006, Department of Geology, University of Kansas.
- “Fundamentals of GPR Investigation and application in LNAPL detection”, 2002, School of Civil Engineering, Purdue University.
- “LNAPL detection using GPR attribute analysis”, 2002, Department of Civil and Environmental Engineering, Utah State University.
- “Fundamentals of GPR Investigation”, 2000, Department of Geology and Geophysics, Rice University.

TECHNICAL REPORTS

- Bradford, JH, Dickins, D, and Brandvik, PJ, 2008, Detection of snow covered oil spills on sea ice using airborne ground-penetrating radar: CGISS Technical Report 08-03
- Dickins, D., Brandvik, P.J., Faksness, L., Bradford, J., and Liberty, L., 2006, 2006 Svalbard Experimental Spill to study spill detection and oil behaviour in ice: United States Department of Interior, Minerals Management Service, CGISS Technical Report # 06-02
- Dickins, D., Hirst, B., Gibson, G., Liberty, L., Bradford, J., Jones, V., Owens, E., Zabilansky, L., and De Vitas, D., 2005, New and Innovative Equipment and Technologies for the Remote Sensing and Surveillance of Oil in and Under Ice: United States Department of Interior, Minerals Management Service.
- Bradford, J.H., Holbrook, W.S., and Smithson, S.B., 2004, Material Property Estimation for Direct Detection of DNAPL using Integrated Ground-Penetrating Radar Velocity, Imaging and Attribute Analysis: Technical Report: BSU CGISS 04-03, US Department of Energy Grant Number: DE-FG07-99ER15008, 265 p.
- Bradford, J.H., Liberty, L.M., and Squires, E., 2004, Imaging shallow stratigraphy and bedrock at Tamarack Resort using shallow seismic reflection: Technical Report BSU CGISS 04-01, 20 p.
- Bradford, J.H. and Swift, G.W., 1994, Ethanol as combustion fuel for motor vehicles: A review: Technical report prepared for Kansas State Legislature

PROFESSIONAL MEMBERSHIPS

- American Geophysical Union
 International Glaciological Society
 Society of Exploration Geophysicists
 Environmental and Engineering Geophysical Society