

CURRICULUM VITAE

JOHN H. BRADFORD

Title: CGISS Director, Associate Professor
Address: Center for Geophysical Investigation of the Shallow Subsurface
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EDUCATION

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

Dissertation Title: Characterizing Shallow Aquifers with Wave-Propagation Based
Geophysical Methods: Imaging and Attribute Analysis

Thesis Advisors: Manik Talwani, Schlumberger Chair of Advanced Studies and Research,
Rice University (Now President, IODP)
Dale Sawyer, Professor, Rice University

PROFESSIONAL APPOINTMENTS

Director, Center for Geophysical Investigation of the Shallow Subsurface, (1/2006-present)
Associate Professor, Boise State University, Boise, ID (8/08 - present)
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)
Research Scientist, Houston Advanced Research Center, The Woodlands, TX (8/97 - 9/98)
Research Associate, Houston Advanced Research Center, The Woodlands, TX (5/97 - 8/97)
Research Associate, Houston Advanced Research Center, The Woodlands, TX (5/95 - 8/95)

AWARDS AND HONORS

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
Engineering Alumnus Scholar, University of Kansas, 1991-1994
Charles Spahr Engineering Scholarship, University of Kansas, 1991
ΤβΠ, Engineering Honor Society, 1992
ΣΠΣ, Physics Honor Society, 1992
ΦκΦ, Academic Honor Society, 1992

GEOPHYSICS COMMUNITY SERVICE

Associate Editor, *Geophysics*, (1/05 - 12/08)
Society of Exploration Geophysicists, Near Surface Section, Advisory Committee, 2008
Society of Exploration Geophysicists, Near Surface Section, Publications Committee, 2008
AGU Hydrogeophysics Technical Committee, 2006-present
Journal Reviewer for: Nature, Geophysics, Geophysical Research Letters, Environmental and Engineering Geoscience, Journal of Applied Geophysics, Journal of Environmental & Engineering Geophysics, Groundwater, Cold Regions Science and Technology, Water Resources Research, Journal of Glaciology, Geophysical Prospecting, Vadose Zone Journal, Near Surface Geophysics
Convened Sessions at: Symposium on the Application of Geophysics to Environmental and Engineering Problems 2009, AGU 2008 fall meeting, European Association of Geoscientists and Engineers 2007 annual meeting, AGU 2007 fall meeting, 2006 SEG annual international meeting.

COURSES TAUGHT

Physics of the Earth (undergraduate)
Seismic Methods (undergraduate)
Seismic Methods (graduate)
Electromagnetic and Seismic Wave Propagation (graduate)

GRADUATE STUDENTS

Josh Nichols, PhD Aspirant, Boise State University (Principal Advisor)
Joel Brown, PhD Aspirant, Boise State University (Principal Advisor)
Leah Steinbronn, MS Candidate, Boise State University (Principal Advisor)
Emily Hinz, PhD Aspirant, Boise State University (Principal Advisor)
Emily Park, MS Candidate, Boise State University (Principal Advisor)
Shannon Murray, PhD Aspirant, Boise State University (Principal Advisor)
Jake Deeds, MS 2002, University of Wyoming (Committee member)
Scott Hess, MS, 2006, Boise State University (Principal Advisor)
Troy Brosten, PhD 2008, Boise State University (Principal Advisor)

PEER REVIEWED PUBLICATIONS

(* - indicates student first author)

*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 hyperheic zone investigations: Near Surface Geophysics, in press.

- Bradford, J.H., Nichols, J., Mikesell, D., Harper, J., 2009, Continuous multi-fold acquisition and analysis of ground-penetrating radar data for improved characterization of glacier structure and water content: *Annals of Glaciology*, 51, in press.
- *Meierbachtol, T.W., Harper, J.T., Humphrey, N.F., Bradford, J.H., Shaha, J., 2008, Dynamic basal drainage adjustments during sliding accelerations from borehole response tests: Bench Glacier, Alaska: *Journal of Geophysical Research (Earth Surface)*, in press.
- Bradford, J.H., Clement, W., and Barrash, W., 2008, Estimating porosity with ground-penetrating radar reflection tomography: A controlled 3D experiment at the Boise Hydrogeophysical Research Site: *Water Resources Research*, doi:10.1029/2008WR006960, in press.
- *Brown, J., Nichols, J., Steinbronn, L., and Bradford J., 2008, Improved GPR interpretation through resolution of lateral velocity heterogeneity: Example from an archaeological site investigation: *Journal of Applied Geophysics*, doi:10.1016/j.jappgeo.2008.08.014, in press.
- 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, Flushing of dead zone storage during instantaneous and constant rate tracer additions in two Alaskan tundra streams: *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 stream reach residence time distribution characterized by tracer experiments of different durations: *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 stream 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. Effects of thermokarst activity on ecosystem dynamics in streams draining the foothills of the North Slope, Alaska. *Journal of Geophysical Research (Biogeosciences)*, 113, G02026, doi:10.1029/2007JG000470.
- Bradford, J.H., 2008, Measuring lateral and vertical heterogeneity in vadose zone water content 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 to 3D GPR contaminated site characterization: *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, 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 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.

PAPERS IN REVIEW

- Bradford, J.H., Dickins, D.F., and Brandvik, P.J., in review, Detection of snow covered oil spills on sea ice using ground-penetrating radar: *Geophysics*
- Bradford, J.H., Harper, J.T., and Brown, J., in review, Measuring complex dielectric permittivity from ground-penetrating radar to estimate liquid water content in snow: *Water Resources Research*
- *Brown, J.M., Harper, J.T., Bradford, J.H., in review, A radar transparent layer in a temperate valley glacier: Bench Glacier, Alaska: *Journal of Geophysical Research (Earth Surface)*
- *Brosten, T.R., Bradford, J.H., McNamara, J.P., Gooseff, M.N., Zarnetske, J.P., Bowden, W.B., and Greenwald-Johnston, M.E., in review, Estimating 3D variation in active-layer thickness beneath arctic streams using ground-penetrating radar: *Journal of Hydrology*
- Martin, A.J., Wyld, S.J., Wright, J.E., Bradford, J.H., in review, The Lower Cretaceous King Lear Formation, northwest Nevada: Implications for Mesozoic orogenesis in the western U.S. Cordillera: *Geological Society of America Bulletin*.

*Hess, S., Fairley, J.P., Bradford, J.H., Lyle, M., Clement, W., in review, Evidence for composite hydraulic architecture in an active fault system based on 3D seismic reflection, time-domain electromagnetics, and temperature data: Near Surface Geophysics

CURRENT AND PAST FUNDED RESEARCH GRANTS AND CONTRACTS

- 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

“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

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

OUTREACH ACTIVITIES

“Geophysical Methods for Characterizing Geothermal Resources”, presentation in cooperation with the Idaho Department of Water Resources to the City Council, Lava Hot Springs, ID, March 2004.
“Media Day at the Boise Hydrogeophysical Research Site”, research demonstration for Boise local media, October, 2006.
“Imaging the subsurface with ground-penetrating radar: An introduction”, Invited talk for the Idaho Museum of Mining and Technology, 2007.
Guest on BSU Radio's "New Horizons in Education", hosted by BSU president Bob Kustra, Dec. 2007.
“Investigating Polar Response to Climate Change using Geophysical Tools”, Boise State University sponsored lecture as part of national Focus the Nation Initiative, January, 2008.
"Ground-penetrating radar for detection of crude oil spills in the Arctic environment", March, 2008, Workshop for the following agencies: Alaska Department of Conservation, US Environmental Protection Agency, North Slope Borough, Alaska Clean Seas, Inc.

UNIVERSITY SERVICE

Department
CGISS Director, Winter 2006 - present
Department of Geosciences Tenure and Promotion Committee, 2008-present
INRA Geophysics workshop, Organizer and lecturer, 2008
Geophysics faculty search committee chair, 2007-2008
Geophysics graduate program coordinator, spring 2008
Geophysics faculty search committee chair, 2006 - 2007
Geophysics undergraduate curriculum revision committee member, 2006-2007
Established and organized internal Geosciences research seminar, Fall 2005 - present
INRA Geophysics workshop for graduate fellows, Cadre member, 2005-2006
University
BSU Centers and Institutes working group, 2008 - present
COAS Tenure and Promotion committee, 2008

POSTERS AND ORAL PRESENTATIONS

Bradford, J.H., and Dickins, D.F., 2008, 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.

- Bradford, J.H., and Oldow, J.S., 2008, High-Resolution Seismic Reflection to Measure Displacement along Shallow, Hidden Faults In the Northern Basin and Range: 2008 GSA Ann. Mtg., Geol. Soc. Amer., GSA Abstracts with Programs.
- Bradford, J.H., Nichols, J., Mikesell, D., and Harper, J.T., 2008, Continuous multi-fold acquisition and analysis of ground-penetrating radar data for improved characterization of glacier structure and water content: 2008 International Symposium on Radioglaciology: Madrid, Spain, International Glaciological Society
- Brosten, T.R., Bradford, J.H., McNamara, J.P., Zarnetske, J.P., Gooseff, M.N., Bowden, W.B., and Greenwald, M.J., 2007, Estimating 3D Variation in Active-Layer Thickness Beneath Arctic Streams Using Ground- Penetrating Radar, *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract H21B-0509.
- Bowden, W.B., Greenwald, M.J., Gooseff, M.N., McNamara, J.P., Bradford, J., Zarnetske, J.P., and Brosten, T., 2007, Stoichiometry of Carbon, Nitrogen, and Phosphorus Regeneration Interactions in the Hyporheic Zones of Arctic Streams Draining Areas of Continuous Permafrost: *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract B42A-05.
- Bradford, J.H., Clement, W., Nichols, J., Brown, J., Mikesell, D., Harper, J., Humphrey, N., and Tshetter, T., 2007, Geophysical imaging of a temperate glacier's hydrologic system in 1, 2, and 3 dimensions: *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract H23H-06.
- Zarnetske, J.P., Gooseff, M.N., Bowden, W., Greenwald, M.J., Brosten, T.R., Bradford, J.H., McNamara, J.P., 2007, Influence of Morphology and Permafrost Dynamics on Surface Water - Groundwater Exchange in Arctic Headwater Streams under Present and Enhanced Thaw Conditions: *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract H31G-0740.
- Steinbronn, L. , Bradford, J., Liberty, L., Dickins, D., Brandvik, P.J., 2007, Oil Detection In and Under Sea Ice Using Ground-Penetrating Radar: *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract H31G-0740.
- Gooseff, M.N., Cardenas, M.B., Zarnetske, J.P., Bowden, W.B., Greenwald-Johnston, M., McNamara, J.P., Bradford, J.H., Brosten, T.R., 2007, Channel-Streambed Interactions Over and Under Ice: *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract H23J-02.
- Brown, J.M., Bradford, J., Harper, J.T., Pfeffer, W.T., Humphrey, N.F., 2007, Ice penetrating radar surveys along the EGIG line in the percolation zone of Western Greenland: *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract NS11A-0161.
- Nichols, J.D., Bradford, J., Harper, J., Mikesell, D., 2007, Englacial Characterization of a Temperate Glacier Using 3D Multioffset Multi-channel GPR: *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract NS11A-0166.
- Mikesell, D., Bradford, J.H., van Wijk, K., Raza, T., 2007, Exploring the Possibilities of Passive Seismic Interferometry to Image Temperate Glaciers: *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract NS11A-0153.
- Bradford, J.H., and Wu, Y., 2007, Instantaneous Spectral Analysis: Time-frequency Mapping via Wavelet Matching with Application to 3D GPR Contaminated Site Characterization: Symp. Appl. Geophys. Env. Eng. Prblm: Denver, CO, Env. Eng. Geophys. Soc.
- Brown, J.M., Harper, J.T., Bradford, J.H., and Humphrey, N.F., 2006, Temporal Variation of Depth of the Radar-Transparent Layer Within Bench Glacier, AK, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract C31A-1233.
- Meierbachtol, T.W., Harper, J.T., Humphrey, N.F., and Bradford, J., 2006, Englacial and Subglacial Water Flow Elucidated by Active and Passive Borehole Experiments: Bench Glacier, Alaska, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract C31A-1229.

- Nichols, J.D., Bradford, J., and Harper, J., 2006, Multi-channel, Multioffset, GPR Data Acquisition on a Temperate Alpine Glacier, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract C41A-0303.
- Tschetter, T.J., Humphrey, N.F., Harper, J.T., and Bradford, J.H., 2006, Monitoring Meltwater Generation and Transport in a Ripe Glacial Snowpack, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract C21C-1177.
- Cozzetto, K., Gooseff, M., Neupauer, R., McNamara, J., Brosten, T., Bradford, J., and Bowden, B., 2006, Investigations of Hyporheic Temperature Regimes in Arctic Alaska Streams Using Time Series Analysis Techniques, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract B23A-1062.
- Bradford, J., and Clement, W., 2006, Accuracy and precision of porosity estimates based on velocity inversion of surface ground-penetrating radar data: A controlled experiment at the Boise Hydrogeophysical Research Site, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract H43G-06.
- Harper, J.T., Humphrey, N.F., Pfeffer, W.T., and Bradford, J.H., 2006, Linking Water to Sliding Dynamics at the Full-Glacier Scale, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract C54A-07.
- Brosten, T.R., Bradford, J.H., McNamara, J.P., Gooseff, M.N., and Bowden, W.B., 2006, Using Multi-offset GPR Data to Estimate Porosity Variations Beneath Stream Channels, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract H43G-07.
- Bradford, J.H., 2006, Pre-stack Analysis of Multi-Fold GPR Data for Characterization of Shallow Groundwater Systems: Society of Exploration Geophysicists Hydrogeophysics Workshop, Summer 2006, Vancouver, BC.
- Bradford, J.H., 2006, Frequency dependent attenuation analysis of ground-penetrating radar data: SAGEEP 2006 Proceedings, Symp. Appl. Geophys. Env. Eng. Prblm: Seattle, WA, Env. Eng. Geophys. Soc., 1532-1544.
- Brosten, T.R., Bradford, J.H., McNamara, J.P., Bowden, W.B., Gooseff, M.N., Zarnetske, J.P., 2005, Characterizing subsurface active-layer permafrost beneath arctic streams using 3D ground-penetrating radar, *Eos Trans. AGU*, 86(52), Fall Mtg, Suppl., Abstract C31A-1115.
- Zarnetske, J.P., Gooseff, M.N., Bowden, W.B., Johnston, M.E., McNamara, J.P., Bradford, J.H., and Brosten, T.R., 2005, Effect of morphology and permafrost on hyporheic dynamics in two tundra streams on the North Slope of Alaska, *Eos Trans. AGU*, 86(52), Fall Mtg, Suppl., Abstract C21C-1114.
- Bradford, J., Harper, J., Hess, S., and Allen, A., 2005, Three-dimensional GPR investigation of intraglacial hydrologic structures, *Eos Trans. AGU*, 86(52), Fall Mtg, Suppl., Abstract C13B-0299.
- Brown, J.M., Harper, J.T., Bradford, J.H., and Humphrey, N.F., 2005, Time variability of radar reflections from englacial and subglacial waters, *Eos Trans. AGU*, 86(52), Fall Mtg, Suppl., Abstract C13B-1076.
- Harper, J.T., and Bradford, J.H., 2005, Field validation of a new method for inverting GPR measurements for the liquid water content of snow, *Eos Trans. AGU*, 86(52), Fall Mtg, Suppl., Abstract C21A-1005.
- Bradford, J.H., 2005, Measuring lateral and vertical electromagnetic velocity in the vadose zone using GPR reflection tomography: 75th Ann. Internat. Mtg., Soc. Expl. Geophys., Expanded Abstracts, NSE-2.7, 1089-1092.

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