

Susan Hubbard, PhD

Curriculum Vitae

Deputy Laboratory Director, Science and Technology
Oak Ridge National Laboratory
<https://www.ornl.gov/staff-profile/susan-s-hubbard>

As the Deputy for Science and Technology at Oak Ridge National Laboratory (ORNL), Susan oversees one of the nation's most extensive fundamental science and energy research portfolios. In partnership with other ORNL leaders, Susan contributes to the planning and execution of Laboratory-level policies and initiatives. She also serves as ORNL's chief research liaison with the University of Tennessee, other national laboratories, ORNL core universities, and other institutional partners.

Susan's is recognized for her leadership in developing the field of hydrogeophysics. Her research focuses on quantifying terrestrial processes that govern water availability, water quality, carbon cycling, and agriculture through advancing geophysical and data fusion methods. Among other recognitions, she is a member of the National Academy of Engineering, and an elected Fellow of the American Academy of Arts and Sciences, the American Geophysical Union, and the Geological Society of America. She has an extensive service record for the scientific professional community and the Department of Energy.

Dr. Hubbard is committed to fostering a diverse and inclusive culture, and to the development of early-career scientists.

PROFESSIONAL POSITIONS

2022-present, Deputy Director for Science and Technology, Oak Ridge National Laboratory
2015-2022, Founding Associate Laboratory Director, Berkeley Lab Earth & Environ. Sciences
2015-2022, Full Professor Adjunct, UC Berkeley, Environmental Science, Policy and Mgmt.
2010-2015, Director & Deputy Director Earth Sciences Division, Berkeley Lab
2007-2010, Founding Associate Director, UC Berkeley Water Center
1998-2022, Earth Scientist, Berkeley Lab
1990-1993, Geophysicist, Arco Oil and Gas
1985-1987, Geologist, U.S. Geological Survey

EDUCATION

Ph.D. Civil and Environmental Engineering, Hydrogeology focus, UC Berkeley
M.S. Geophysics, Virginia Tech.
B.S. Geology, University of California, Santa Barbara.

AWARDS AND RECOGNITIONS (SELECT):

2024 Women We Admire Award: Top 50 Women in Technology
2023 Women We Admire Award: Top 50 Women in Technology
2022, Society of Geophysicists Global Lecturer Award, Near Surface Geophysics
2020, Elected Member, National Academy of Engineering

2019, Elected Fellow, American Academy of Arts and Sciences
2019, American Institute of Hydrology Robert G. Wetzel Award on Water Quality
2019, Distinguished Alumni, UC Santa Barbara Earth Sciences Department
2019, Alameda County CA Women's Hall of Fame, Science Award
2017, Elected Fellow, American Geophysical Union
2016, Hal Mooney Award, Society of Exploration Geophysicists
2014, Distinguished Alumni, Civil and Environmental Engineering Academy, UC Berkeley
2014, Soc. for Technical Communication, Distinguished Technical Communication Award
2013, Outstanding Women @ Berkeley Lab recognition
2011, Elected Fellow, Geological Society of America
2010, Birdsall-Dreiss Distinguished Lecturer Award, Geological Society of America
2009, Top Associate Editor Award, Journal of Hydrology
2009, Frank Frischknecht Leadership Award, Society of Exploration Geophysicists

PROFESSIONAL SERVICE (SELECT):

Advisory / Board Roles

2024-present, Board member, Baker School of Public Policy and Public Affairs, UT Knoxville
2024-present, Board member National Renewable Energy Laboratory (NREL) Alliance
2024-present, Chair of National Renewable Energy Laboratory (NREL) S&T Committee
2023-Present, Board, University of TN – Oak Ridge Innovation Institute
2023-present, Gubernatorial Appointee, Board member of LaunchTN
2023-present, Council of Competitiveness Technology Leadership and Strategy Initiative Member
2022-present, Univ of TN Knoxville External Adv. Council for Research, Innovation and Econ. Dev.
2022-present, Board member, Georgia Inst. Tech. Woodruff School of Mech. Engineering
2022-2023, Advisory Board, ORNL Center for Bioenergy Innovation (CBI)
2022-present, Distinguished Expert, California Council of Science and Technology (CCST)
2021-2024, Board member, Distinguished Alumni Academy, UC Berkeley C&E Engineering
2021-2022, Board of Directors, California Council of Science and Technology (CCST)
2020-2022, Member, Program Committee, California Council of Science and Technology (CCST)
2020-2024, NAWI (National Alliance for Water Innovation) Hub Board member and founding Chair
2000-2022, Member, Council of Energy, Climate and Environmental Deans, UC Berkeley
2017-2021, Advisory Board, International Soil Modeling Consortium
2017-2022, Advisory Board, EPA Superfund Program 'Exposome' UCB
2017-2019, Partnership Board, DOE-BER Environmental System Science Cyberinfrastructure
2016-2019, Scientific Advisory Board, NSF Arctic Data Center UCSB
2016-2019, Advisory Board, Civil and Environmental Engineering Dept, UC Berkeley
2015-2020, Council member, California Council on Science and Technology (CCST)
2015-2019, Director's Council, University of California Water Science
2015-2018, Advisory Board, Interoperable design extreme scale software (IDEAS; DOE-BER)
2014-2018, Advisory Board, Radionuclide Waste Disposal, EPSCoR Program, South Carolina
2014-2017, Sr Advisor, DOE Advanced Simulation Capability for Env. Mgmt (ASCEM, DOE-EM)
2011, Advisory Board, SmartGeo NSF IGERT, Colorado School of Mines
2010-2015, DOE-BERAC Federal Advisory Committee member, Biological & Environ. Research
2010, Technical Advisory Committee, DOE-EM

2006, Advisory Committee, Forschungszentrum Jülich National Laboratory, Germany

Select Professional Community and DOE Service:

2024, Chief Research Officer co- of DOE-SC Roundtables on Artificial Intelligence
2024, Sr. Co-sponsor, University of Chicago Strategic Laboratory Leadership Program
2024, Mentor, UTMC 'Women Empowered to Make a Difference' Program
2020-present, Chair, Vice-chair, and member National Academy of Engineering (NAE) Committee
2022-2023, Co-chair, Brookhaven Laboratory Director Search Committee
2021-2024, Member, SNC National Academy of Engineering
2020-2022, AAAS Chair Elect, Chair and Retiring Chair, Atmospheric and Hydrospheric Section
2021, University of California Wildfire, CA Agency Engagement Leader
2020-2021, Member, DOE LOB Working Group: Examining Opportunities for Improvements and Flexibilities Enhance Recruitment and Retention
2020, External reviewer, select DOE National Lab Diversity Programs/Plans
2020, Review Committee, Manaaki Whenua Landcare, New Zealand Natl. Lab
2019, Review Committee, Virginia Tech Geosciences
2020-2021, Canvassing Committee, American Geophysical Union
2019-2021, Nominations Committee, American Geophysical Union
2019-2022, Senior Leader, International Early Career Critical Zone Science Consortium
2019-2020, Steering Committee, Interagency Conference on Research in Watersheds (ICRW)
2018- 2020, Member, Macelwane Award Committee, American Geophysical Union
2018- 2020, Member, Nominations Committee, Geological Society of America
2018-2019, Member, California AB1281 Produced Water Executive Committee, CCST
2018, Member, Executive Committee, California Water-Data AB1755 Governance & Funding
2017, Co-chair, Fall meeting session, American Geophysical Union
2018, Organizer, Collaborative Watershed Science Workshop, Crested Butte CO
2017, Organizer, Open and Transparent California Water Data Capstone Workshop, Berkeley,
2017, Writer, DOE-BER Grand Challenges in Biological and Environmental Sci. Chapter Report
2017, Co-Organizer, Environmental Knowledgebase Workshop, BIDS, Berkeley
2016, Co-Chair, DOE-BES Basic Research Needs Workshop Water-Energy, Wash DC
2015, Panel Lead and Writer, DOE-BES Basic Research Needs for Environmental Mgmt.
2015, Technical lead, DOE Subsurface Science Crosscut, National Laboratory Engagement Day
2015, Committee member and Writer, DOE-BES Basic Research Needs for Water-Energy
2014-2016 UC Global Food Initiative, Berkeley Lab Representative
2014-2018, Co-lead, National Subsurface DOE 'crosscut' Initiative
2014, Session Chair, Subsurface fracture control, Rock and Fluid Physics Conference, Shell Technology Center
2014, Co-Chair, Complex Soil Systems SSSA/Bouyoucos Conference, Berkeley
2013, External Review Committee, Helmholtz Association Terrestrial Program, Germany
2012, External Review Committee, Stanford Dept of Energy Resources Engineering
2013, Chair, Geological Society of America, Birdsall Dreiss Search Committee
2012, Chair, Geophysical Characterization of Permafrost Systems Special Session, Fall AGU, San Francisco
2012, Contributor/writer, DOE-BER Technology Innovation 'Virtual Laboratory' Report (DOE/SC-0156)

2010, Contributor/writer, DOE-BER “Grand Challenges for Biological and Environmental Research: A Long-Term Vision” (DOE/SC-1035, 2010)

2010, Co-lead and co-author, DOE-BER “Complex System Science for Subsurface Fate and Transport” (DOE/SC0123, 2010) and workshop

2010, Writer, DOE-EM Long-Range Deep Vadose Zone Program Plan (DOE/RL-2010-89)

2010, Session chair, Computational Methods in Water Res., Barcelona, June 2010,

2010, Session Chair, Goldschmidt conference, Session Chair Knoxville, TN, June 2010.

2010, Co-author, DOE-EM Scientific Opportunities to Reduce Risk in Groundwater and Soil Remediation (PNNL-18516).

2008, Co-organizer, Computational Methods in Water Resources Conference, San Francisco

2008, Co-organizer, Chapman Conference, Biogeophysics, Portland Maine

2006, Contributor, DOE-BES Basic Research Needs for Geosciences: Facilitating 21st Century Energy Needs

2002-2006, Chair, AGU Hydrogeophysics Technical Committee

2002, Founder, AGU Hydrogeophysics Technical Committee

2002-2006, US representative, International Ass. Hydrological Sci. “2020 “Working Group

2004, Panelist, DOE-BES workshop noninvasive Earth monitoring, Houston Tx

2005, Panelist, DOE EM Geop. Characterization and monitoring workshop.

2005, Chair, Watershed Characterization Special Session, Fall AGU, San Fran.

2004, Chair, Hydrogeophysics Special Session, Fall AGU, San Francisco.

2003, Chair, Hydrogeophysics Special Session, Fall AGU, San Francisco

2003, Organizer, Coupled Processes DOE-BER Workshop, Berkeley CA, LBNL

2003, Chair, Coupled Processes DOE-BER Subsurface Science Session, DOE EMSP, WA

2002, Co-Organizer, NATO Hydrogeophysics Advanced Study Inst., Czech Republic

2000, Chair, Breakthroughs in Field Scale Bacterial Transport, Fall AGU, S.F.

Editorial Boards:

2010-2015, Associate Editor JGR-Biosciences

2007-2013, Co-Editor Vadose Zone Journal

2007-2010, Associate Editor, Journal of Hydrology

2001-2005, Associate Editor Water Res. Research

INVITED SPEAKING ENGAGEMENTS (SELECT):

2024, Moderator, AAAS Annual Meeting, ‘Increasing Integration of Engineering and Earth System Science’ session, Denver, CO

2024, CES, ‘National Laboratories and Industry’ fireside chat with DOE’s Chief Commercialization Officer, Las Vegas NV

2024, Keynote, Purdue University Discovery Park Distinguished Lecture, “Water innovations for the 21st century”, West Lafayette IN, April 2024

2024, Panelist, Committee on Competitiveness, Redefining Place and Building the Future Innovation Ecosystem for Mobility, Energy & Manufacturing, Nashville April 2024

2023, Keynote and Panelist, ‘Accelerating Technologies to Enable the Grid of the Future’, IEEE

Energy Conversion Congress and Expo (ECCE) Conference, Nashville TN
2022, Secretary of Energy Advisory Board (SEAB) annual meeting, 'Climate resilient water systems'
2022, SEG Global Lecturer Award, 'A Watershed Moment for Watershed Science'
2021, Panelist, DOE-BER Mountainous Hydroclimate Workshop, Washington DC
2021, Plenary speaker, DOE-BER ESS PI Meeting, Washington DC
2021, Invited speaker, CUASHI Critical Zone - Watershed Seminar Series (virtual)
2021, Moderator, UC Wildfire Virtual Symposium with California Agency Leaders, California
2021, University of California, Davis CA
2021, University of Washington, St. Louis MO
2021, University of Idaho and Washington State Invited Lecture, ID
2020, American Geophysical Union Invited talk
2020, Interagency Conference on Research in Watersheds
2020, AAAS Panel Moderator, Wildfire Resilience through Science and Technology
2019, Commencement Speech, Virginia Tech, Geoscience Department
2019, American Geophysical Union Fall Meeting, San Francisco
2019, Stanford University, Geophysics Dept Seminar
2019, CA Contemporary Groundwater Issues Council Panelist, UC Davis
2019, Moderator, Wildfire Panel for CA Legislators, CCST, Sacto CA
2019, University of Wyoming, Laramie, WY
2019, Soil Science Society of America, San Diego, CA
2018, American Geophysical Union Fall Meeting, San Francisco, CA
2018, Tsinghua University, China
2018, Peking University, China
2018, Chinese Academy of Sciences, Tibetan Research Inst Beijing, China
2018, Chinese Academy of Sciences, Env. and Ecosys. Science, Beijing Normal University, China
2017, CA Department of Water Resources, Sacto CA
2017, American Chemical Society, California Water Resiliency, Washington DC
2017, American Geophysical Society Union Fall Meeting, Session H32D, New Orleans, LA
2017, American Geophysical Society Union Fall Meeting, Session H31J, New Orleans, LA
2017, Urbana Champaign Illinois University, Distinguished seminar, Urbana Champaign, Ill
2018, OZCAR France Critical Zone meeting, Frejus, France
2018, Colorado School of Mines Heiland Distinguished Speaker, Golden CA
2018, National Academies Review, Washington DC
2017, UC Berkeley Civil and Environmental Engineering Seminar, Berkeley CA
2017, 27th Annual Intern. Conf. on Soil, Water, Energy, & Air, San Diego, CA
2017, University of Southern California Distinguished Seminar, Los Angeles, CA
2016, American Geophysical Union Fall Meeting, San Francisco
2016, France National Polytechnical Institute, Bordeaux, Distinguished Seminar
2016, University of Saskatchewan Saskatoon Distinguished Lecturer series, Saskatoon, Canada
2016, UC Merced Distinguished Seminar, Merced CA
2016, CUAHSI Big Data Workshop, Shepherdstown, WV
2016, Geotech/Geoengineering Distinguished Lecture, UC Berkeley, CA
2016, KOPRI Polar Science Symposium, Plenary Speaker, Seoul Korea
2016, Waterloo Distinguished 'Watertalks' Lecture Series, Waterloo, Ontario, Canada
2015, Water Resource Sustainability Issues on Tropical Islands Conference, Hawaii

2015, American Geophysical Union Fall Meeting, B52C-04, San Francisco, CA
2015, American Geophysical Union Fall Meeting, Union Session Invited San Francisco, CA
2015, European Geophysical Union Invited Speaker, Vienna Austria
2014, CUAHSI Big Data Bi-Annual Conference, Shepherdstown, WV
2014, University of Wyoming Geology and Geop. Distinguished Lecturer Series, Laramie, WY
2014, Complex Soils Systems 2014 Conference, Berkeley, CA
2014, Jason Group, 'State of Stress in the Engineered Subsurface', Los Angeles, CA
2014, US Energy Association, Research needs in Subsurface Energy Science, Arlington, VA
2014, Shell Subsurface Complexity Workshop, Amsterdam, Netherlands
2014, Env. Science and Policy Mgmt UCB Berkeley Seminar Series, Berkeley CA
2014, DOE Subsurface Biogeochemistry and Terrestrial Ecosystems PI Meeting, Maryland
2013, American Geophysical Union Fall Meeting, San Francisco, CA
2013, Energy Biosciences Institute Seminar Series, Berkeley, CA
2013, Keynote Presentation, Washington Hydrology Symposium, Tacoma, WA
2013, Stanford Environmental Fluid Mechanics and Hydrology Colloquium
2012, American Geophysical Union H53F-1586 AGU, San Francisco, CA
2012, American Geophysical Union, H33N-01 Fall Meeting, AGU, San Francisco, CA,
2012, Water Research Horizon Conference, Berlin, Germany
2012, European Geophysical Union Vienna, Austria
2012, Battelle Chlorinated Conference Keynote, Monterey CA
2011 Dept of Energy Biological and Env Advisory Committee, Washington DC
2011, New Frontiers in Engineering Science for Sustainability, Texas A&M Water Scholar Seminar
2011, University of Nevada, Seminar Speaker, Las Vegas Nevada
2011, Duke University Distinguished Seminar, North Carolina
2011, Advanced Dept of Energy Simulation Capability Workshop, Washington, DC
2011, Rensselaer University Invited Seminar, NY
2011, NSF Water Scholar Seminar Series Keynote, Texas A&M, College Station TX
2010, University of Wisconsin, Madison Invited Seminar, Wisconsin
2010, Argonne National Laboratory Distinguished Speaker, Illinois
2010, Northern Illinois University, Dekalb, Distinguished Seminar, Illinois
2010, Michigan State, East Lansing Michigan
2010, Grand Valley University, Michigan
2010, Groundwater Research Association Distinguished Speaker, Sacramento, CA
2010, Inland Geological Society Invited Speaker, Riverside, CA
2010, Computational Methods in Water Resources Keynote, Barcelona Spain
2010, UC Davis Hydrological Seminar Series, Davis CA
2010, National Groundwater Summit Keynote, Denver, CO
2010, UC Berkeley Civil and Environmental Eng. Seminar Series, Berkeley CA
2010, Dept of Energy Env Remediation Science Program Platform Presentation, Washington, DC,
2010, Distinguished Environmental Lecture, Florida International University, Miami FLA
2010, University of Florida Spring Seminar Series, Gainesville, FLA
2010, Delaware Environmental Institute Distinguished Lecture
2010, UMass Environmental Lecture Series, Amherst, Massachusetts
2010, K. Douglas Nelson Lecture Series, Syracuse University, New York
2009, Semi-Annual Dawdy Invited Lecture, Department of Geos., San Francisco State University

2010, Oregon State University Geoscience Seminar Series
2010, Portland Environmental Geology Seminar Series, Oregon
2009, New Mexico Tech Hydrology Seminar, Socorro, NM
2009, Frontiers in Geosciences' Distinguished Colloquium, Los Alamos Natl Laboratory
2009, American Geophysical Union Fall Meeting, San Francisco
2009, American Geophysical Union Spring Meeting, Toronto, Canada
2009, Association for Env. Health and Sciences Invited platform speaker, San Diego
2008, Stanford Environmental and Fluid Mechanics Invited Seminar
2008, U.S.G.S. Water Research Division Seminar Series, Menlo Park, CA
2008, Gordon Conference Flow in Porous Media, Oxford England
2007, NRC Workshop on Uncertainty, sensitivity and parameter estimation Wash DC
2007, American Geophysical Union Fall Meeting, San Francisco, CA
2007, UC Davis Engineering Seminar Series, Davis CA
2006 American Geophysical Union, Fall Meeting San Francisco, CA
2006 Geological Society of America, Philadelphia, PA
2006, Groundwater Resources of California, Long Beach, CA
2006, Oregon State University 'World-Class Women in Water' seminar series, Corvallis, OR
2006, Seismological Laboratory Seminar Series, Berkeley CA
2006, Computational Methods in Water Resources (CMWRC), Platform Speaker, Copenhagen
2005, IWAGPR Conference Keynote, Delft, Netherlands
2004, UC Merced Environmental Seminar Series, Merced CA
2004, Univ of Texas at Austin, Austin, TX
2004, Waste Management Conference Keynote, Tuscon AZ
2005, American Geophysical Union Frontier Lecture, Spring Meeting Montreal, Canada
2004, Dept of Energy Characterization and Monitoring Workshop Keynote, Salt Lake City
2004, Univ of Buffalo, UB Geology Pegrem Speaker Series, New York
2004, University of Kansas at Lawrence, Seminar Speaker, Lawrence Kansas
2004, USGS Water Resources Seminar, Menlo Park, CA
2003, Heiland Distinguished Lecturer, Colorado School of Mines, Golden, CO
2003, Vadose zone characterization Series, University of Arizona, Tuscon, AZ
2003, NRC-180 Precision Agriculture Conference, UC Davis, CA
2002, American Geophysical Union Spring Meeting Washington DC
2001, Geological Society of America Annual Meeting, Boston, MA
2001, UC Berkeley Environmental Engineering Series, Berkeley CA
2001, American Geophysical Union Fall Meeting, San Francisco
2001, Kovacs Colloquium Speaker: Groundwater Resources at Risk, IAHS, Paris, France
2001, American Geophysical Union Spring Meeting, Washington, DC
2000, Boise State Geology Seminar Series, Boise, ID
2000, UC Davis Hydrology Seminar Series, Davis, CA

MEMBERSHIPS

National Academy of Engineering
American Academy of Arts and Sciences
American Association for Women in Science
American Geophysical Union
Geological Society of America
Society of Exploration Geophysicists
American Association for the Advancement of Science

PUBLICATIONS

[Researcher ID/Publons E-9508-2010](#); [Google Scholar](#)

Journal Papers

1. Wang, C. et al. (2024), Local-scale heterogeneity of soil thermal dynamics and controlling factors in a discontinuous permafrost region, *Environmental Research Letters*, DOI 10.1088/1748-9326/ad27bb
2. Brown, M. A., et al., (2024). Southeast Decarbonization Workshop- Activating science, business, and community partnerships. Oak Ridge National Laboratory. DOI: <https://doi.org/10.2172/2404612>.
3. Shirley, I. et al, (2023), Disentangling the effect of geomorphological features and tall shrubs on snow depth variation in a sub-Arctic watershed using UAV derived products, *EGUsphere*, <https://doi.org/10.5194/egusphere-2023-968>
4. Newcomer et al., (2023). Prolonged Drought in a Northern California Coastal Region Suppresses Wildfire Impacts on Hydrology, *Water Resources Research*. WRCR26769
5. Uhlemann, S. et al., (2023). Estimating permafrost distribution using co-located temperature and electrical resistivity measurements, *Geophysical Research Letters*, doi.org/10.1029/2023GL103987
6. Dafflon, B. et al., (2023). Advanced monitoring of soil-vegetation co-dynamics reveals the successive controls of snowmelt on soil moisture and on plant seasonal dynamics in a mountainous watershed, *Frontiers in Earth Science* 11, 976227
7. Shirley, I. et al., (2022). Surface Hydrology and Soil Properties Drive Heterogeneity in Permafrost Distribution, Vegetation Dynamics, and Carbon Cycling in a Subarctic Watershed, *Journal of Geophysical Research: Biogeosciences* 127 (9), e2022JG006864
8. McLachlan, P. et al., (2022). Estimating grapevine-relevant physicochemical soil zones using apparent electrical conductivity and in-phase data from EMI methods, *Geoderma*, Volume 426,2022
9. Dafflon, B. et al. (2022). A distributed temperature profiling system for vertically and laterally dense acquisition of soil and snow temperature. <https://doi.org/10.5194/tc-2021-292>
10. Uhlemann, S. et al. (2022). Surface parameters and bedrock properties co-vary across a mountainous watershed: Insights from Machine Learning and Airborne EM, *Science Advances*, DOI: 10.1126/sciadv.abj2479
11. McLachlan, P. et al., (2022). Estimating grapevine-relevant physicochemical soil zones using apparent electrical conductivity and in-phase data from EMI methods, *Geoderma*, Volume 426,2022, <https://doi.org/10.1016/j.geoderma.2022.116033>.
12. Springer, M. et al., (2022). Variability of snow and rainfall partitioning into evapotranspiration and summer runoff across nine mountainous catchments. *Geophysical Research Letters*, <https://doi.org/10.1029/2022GL099324>

13. Dwivedi, D. et al. (2022). Imputation of contiguous gaps and extremes of subhourly groundwater time series using random forests, *Journal of Machine Learning for Modeling and Computing*. DOI: 10.1615/JMachLearnModelComput.2021038774
14. Varadharajan, C. et al.,(2022). BASIN-3D: A brokering framework to integrate diverse environmental data, *Computers and Geosciences*, <https://doi.org/10.1016/j.cageo.2021.105024>
15. Shirley, I.A. et al. (2022), Rapidly changing high-latitude seasonality: implications for the 21st century carbon cycle in Alaska, *Environmental Research letters* 17(1), DOI 10.1088/1748-9326/ac4362
16. Dwivedi, D. et al., (2022). From Legacy Contamination to Watershed Systems Science: A Review of Scientific Insights and Technologies Developed through DOE-Supported Research in Water and Energy Security. *Environmental Research Letters*, 17 043004
17. Carroll, R. et al. (2022). Variability in observed stable water isotopes in snowpack across a mountainous watershed in Colorado, *Hydrological Processes*. <https://doi.org/10.1002/hyp.14653>
18. Shirley, I. A., Mekonnen, Z. A., Wainwright, H., Romanovsky, V. E., Grant, R. F., Hubbard, S. S., et al. (2022). Near-surface hydrology and soil properties drive heterogeneity in permafrost distribution, vegetation dynamics, and carbon cycling in a Sub-Arctic watershed. *Journal of Geophysical Research: Biogeosciences*, 127, e2022JG006864. <https://doi.org/10.1029/2022JG006864>
19. Shirley, I. et al., (2022). Rapidly changing high-latitude seasonality: implications for the 21st century carbon cycle in Alaska. *Environmental Research Letters* 17 (1), 014032
20. Wainwright, H. et al. (2022), Watershed zonation through hillslope clustering for tractably quantifying above-and below-ground watershed heterogeneity and functions, *Hydrology and Earth System Sciences* 26(2), <https://doi.org/10.5194/hess-26-429-2022>
21. Chen, J. A., B. Dafflon, H.M. Wainwright, A. Tran and S.S. Hubbard (2021). A Subseasonal Regime Approach for Assessing Intra-annual Variability of Evapotranspiration and Application to the Colorado River Basin, *Frontiers in Water*, 2021
22. Cantor, A., Kiparsky, M., Hubbard, S. S., Kennedy, R., Pecharroman, L. C., Guivetchi, K., Darling, G., McCready, C., & Bales, R. (2021). Making a water data system responsive to information needs of decision makers. *Frontiers in Climate*, 2021, <https://doi.org/10.3389/fclim.2021.761444>
23. Varadharajan, C., V.C. Hendrix, D.S. Christianson, M. Burrus, C. Wong, S.S. Hubbard, D.A. Agarwal, (2021), BASIN-3D: A brokering framework to integrate diverse environmental data, *Computers and Geosciences*, 2021,105024, ISSN 0098-3004,
24. doi: 10.1016/j.cageo.2021.105024
25. Dafflon, B., Uhlemann, S., Hubbard, S.S., (2021) Permafrost-Through-Canopy Investigation of Thermal and Ecohydrological Processes in Arctic Systems, *Technical Articles*, Vol. 26. 3 *Climate Change and Critical Zone Geophysics*, *EEGS Fast Times*, <https://fasttimesonline.co/permafrost-through-canopy-investigation-of-thermal-and-ecohydrological-processes-in-arctic-systems/>
26. Yan, Q., Wainwright, H., Dafflon, B., Uhlemann, S., Steefel, C. I., Falco, N., Kwang, J., & Hubbard, S. S. (2021). A hybrid data–model approach to map soil thickness in mountain hillslopes. *Earth Surface Dynamics*, 9(5), 1347–1361. <https://doi.org/10.5194/esurf-9-1347-2021>
27. Chen, J., Dafflon, B., Tran, A. P., Falco, N., & Hubbard, S. S. (2021). A deep learning hybrid predictive modeling (HPM) approach for estimating evapotranspiration and ecosystem respiration. *Hydrology and Earth System Sciences*, 25(11), 6041–6066. doi: 10.5194/hess-25-6041-2021
28. Dwivedi, D., Mital, U., Faybishenko, B., Dafflon, B., Varadharajan, C., Agarwal, D., Williams, K. H., Steefel, C., & Hubbard, S. (2021). Imputation of contiguous gaps and extremes of subhourly groundwater time series using random forests. *Journal of Machine Learning for Modeling and Computing*. <https://doi.org/10.1615/jmachlearnmodelcomput.2021038774>
29. Revil, A., Schmutz, M., Abdulsamad, F., Balde, A., Beck, C., Ghorbani, A., & Hubbard, S. S. (2021). Field-scale estimation of soil properties from spectral induced polarization tomography. *Geoderma*, 403, 115380. doi: 10.1016/j.geoderma.2021.115380

30. Wan, J., Tokunaga, T. K., Brown, W., Newman, A. W., Dong, W., Bill, M., Beutler, C. A., Henderson, A. N., Harvey-Costello, N., Conrad, M. E., Bouskill, N. J., Hubbard, S. S., & Williams, K. H. (2021). Bedrock weathering contributes to subsurface reactive nitrogen and nitrous oxide emissions. *Nature Geoscience*, 14(4), 217–224. doi: 10.1038/s41561-021-00717-0
31. Matheus Carnevali, P.B. et al (2021). Meanders as a scaling motif for understanding of floodplain soil microbiome and biogeochemical potential at the watershed scale. *Microbiome*, 9(1). doi: 10.1186/s40168-020-00957-z
32. Wainwright, H. et al. (2021), High-resolution Spatiotemporal Estimation of Net Ecosystem Exchange in Ice-Wedge Polygon Tundra Using In Situ Sensors and Remote Sensing Data, Land, <https://doi.org/10.3390/land10070722>
33. Hubbard, S.S., Schmutz, M., Balde, A. et al. (2021) Estimation of soil classes and their relationship to grapevine vigor in a Bordeaux vineyard: advancing the practical joint use of electromagnetic induction (EMI) and NDVI datasets for precision viticulture. *Precision Agric.* doi: 10.1007/s11119-021-09788-w
34. Rogers, D.B., Newcomer, M.E., Raberg, J.H., Dwivedi, D., Steefel, C., Bouskill, N., Nico, P., Faybishenko, B., Fox, P., Conrad, M., Bill, M., Brodie, E., Arora, B., Dafflon, B., Williams, K.H. and Hubbard, S.S. (2021) Modeling the Impact of Riparian Hollows on River Corridor Nitrogen Exports. *Front. Water* 3:590314. doi: 10.3389/frwa.2021.590314
35. Kakalia, Z., Varadharajan, C., Alper, E., Brodie, E. L., Burrus, M., Carroll, R. W. H., Christianson, D. S., Dong, W., Hendrix, V. C., Henderson, M., Hubbard, S. S., Johnson, D., Versteeg, R., Williams, K. H., & Agarwal, D. A. (2021). The Colorado East River Community Observatory Data Collection. *Hydrological Processes*, 35(6), e14243. doi: 10.1002/hyp.14243
36. Falco, N., Wainwright, H. M., Dafflon, B., Ulrich, C., Soom, F., Peterson, J. E., Brown, J. B., Schaettle, K. B., Williamson, M., Cothren, J. D., Ham, R. G., McEntire, J. A., & Hubbard, S. S. (2021). Influence of soil heterogeneity on soybean plant development and crop yield evaluated using time-series of UAV and ground-based geophysical imagery. *Scientific Reports*, 11(1). doi: 10.1038/s41598-021-86480-z
37. Uhlemann, S., Dafflon, B., Peterson, J., Ulrich, C., Shirley, I., Michail, S., & Hubbard, S. S. (2021). Geophysical Monitoring Shows that Spatial Heterogeneity in Thermohydrological Dynamics Reshapes a Transitional Permafrost System. *Geophysical Research Letters*, 48, e2020GL091149. <https://doi.org/10.1029/2020GL091149>
38. Newcomer, M. E., Bouskill, N. J., Wainwright, H., Maavara, T., Arora, B., Siirila-Woodburn, E. R., Dwivedi, D., Williams, K. H., Steefel, C., & Hubbard, S. S. (2021). Hysteresis Patterns of Watershed Nitrogen Retention and Loss Over the Past 50 years in United States Hydrological Basins. *Global Biogeochemical Cycles*, 35(4). doi: 10.1029/2020gb006777
39. Hubbard, S.S., et al., (2020), Emerging technologies and radical collaboration to advance predictive understanding of watershed hydro-biogeochemistry, *Hydrological Processes*, 1-8. <https://doi.org/10.1002/hyp.13807>
40. Peruzzo, L. et al., Imaging of Plant Current Pathways for Non-invasive Root Phenotyping using a newly developed Electrical Current Source Density Approach (2020), *Plant and Soil*, <https://doi.org/10.1007/s11104-020-04529-w>
41. Mary, B., Peruzzo, L., Boaga, J., Cenni, N., Schmutz, M., Wu, Y., Hubbard, S.S., and Cassiani, G., (2020), Time-lapse monitoring of root water uptake using electrical resistivity tomography and mise-à-la-masse: a vineyard infiltration experiment, *Soil*, v. 6, p. 95–114, doi: 10.5194/soil-6-95-2020.
42. Wainwright, H.M., C. Steefel, S. Trutner, A. Henderson, E. Nikolopoulos, K. Chadwick, Katherine; N. Falco, C. Wilmer, H. Steltzer, K. Williams, S. Hubbard, K. Schaettle, J. Brown, B. Enquist, (2020), Satellite-derived Foresummer Drought Sensitivity of Plant Productivity in Rocky Mountain Headwater Catchments: Spatial Heterogeneity and Geological-Geomorphological Control, *Env. Research Letters*, 15, 084018
43. Sorensen, P.O et al., The Snowmelt Nice Differentiates Three Microbial Life Strategies that Influence Soil Nitrogen Availability During and After Winter (2020), *Frontiers in Microbiology*, doi: 10.3389/fmicb.2020.00871

44. Arora, B. et al., (2020), Differential C-Q Analysis: A new approach to inferring lateral transport and hydrologic transients within multiple reaches of a mountainous headwater catchment, *Frontiers in Water*, <https://doi.org/10.3389/frwa.2020.00024>
45. Wan, J., Tokunaga, T.K., Williams, K.H., Dong, W., Brown, W., Henderson, A.N., Newman, A.W., and Hubbard, S.S. (2019), Predicting sedimentary bedrock subsurface weathering fronts and weathering rates: *Scientific Reports*, v. 9, doi: 10.1038/s41598-019-53205-2.
46. Varadharajan, C. et al., (2019) Challenges in Building an End-to-End System for Acquisition, Management, and Integration of Diverse Data from Sensor Networks in Watersheds: Lessons from a Mountainous Community Observatory in East River, Colorado, *IEEE Access*, *IEEE Access*, vol. 7, pp. 182796-182813,
47. Arora, B., Wainwright, H.M., Dwivedi, D., Vaughn, L.J., Curtis, J.B., Torn, M.S., Dafflon, B., and Hubbard, S.S. (2019) Evaluating temporal controls on greenhouse gas (GHG) fluxes in an Arctic tundra environment: An entropy-based approach: *Science of The Total Environment*, v. 649, p. 284–299, doi: 10.1016/j.scitotenv.2018.08.251.
48. Tokunaga, T., Wan, J., Williams, K.H., Brown, W., Henderson, A., Kim, Y., Tran, A.P., Conrad, M.E., Bill, M., Carroll, R.W.H., Dong, W., Xu, Z., Lavy, A., Gilbert, B., Romero, S., Christensen, J.N., Faybishenko, B., Arora, B., Siirila-Woodburn, E., Versteeg, R., Raberg, J.H., Peterson, J. and Hubbard, S.S. (2019), Depth- and time-resolved distributions of snowmelt-driven hillslope subsurface flow and transport, and their contributions to surface waters, *Water Resources Research*, doi: 10.1029/2019WR025093
49. Léger, E., Dafflon, B., Robert, Y., Ulrich, C., Peterson, J.E., Biraud, S., Romanovsky, V.E., and Hubbard, S.S. (2019), Distributed Temperature Profiling System Provides Spatially Dense Measurements and Insights about Permafrost Distribution in an Arctic Watershed: *The Cryosphere Discussions*, p. 1–24, doi: 10.5194/tc-2018-264.
50. Alexandratos, S.D., Barak, N., Bauer, D., Davidson, F.T., Gibney, B.R., Hubbard, S.S., Taft, H.L., and Westerhof, P. (2019), Sustaining Water Resources: Environmental and Economic Impact: *ACS Sustainable Chemistry & Engineering*, doi: 10.1021/acssuschemeng.8b05859.
51. Falco, N., Wainwright, H., Dafflon, B., Léger, E., Peterson, J., Steltzer, H., Wilmer, C., Rowland, J.C., Williams, K.H. and Hubbard, S.S. (2019), Investigating Microtopographic and Soil Controls on a Mountainous Meadow Plant Community Using High-Resolution Remote Sensing and Surface Geophysical Data, *JGR Biosciences*, doi.org/10.1029/2018JG004394
52. Tran A.P., Rungee J., Faybishenko, B., Dafflon., B, Hubbard, S.S. (2019) Assessment of Spatiotemporal Variability of Evapotranspiration and Its Governing Factors in a Mountainous Watershed. *Water*. 2019; 11(2):243, doi: 10.3390/w11020243. (article)
53. Hubbard et al., (2018) The East River, CO Watershed: A Mountainous Community Testbed for Improving Predictive Understanding of Multi-Scale Hydrological-Biogeochemical Dynamics, *Vadose Zone Journal*, doi:10.2136/vzj2018.03.0061
54. Mary, B., Peruzzo, L., Boaga, J., Schmutz, M., Wu, Y., Hubbard, S.S., and Cassiani, G., (2018), Small scale characterization of vine plant root water uptake via 3D electrical resistivity tomography and Mise-à-la-Masse method: *Hydrology and Earth System Sciences Discussions*, p. 1–30, doi: 10.5194/hess-2018-238.
55. Wan, J., T. K. Tokunaga, W. Dong, K. H. Williams, Y. Kim, M. E. Conrad, M. Bill, W. J. Riley, and S. S. Hubbard (2018), Deep Unsaturated Zone Contributions to Carbon Cycling in Semiarid Environments, *Journal of Geophysical Research: Biogeosciences*, 123(9), 3045–3054, doi:10.1029/2018jg004669.
56. Christensen, J.N., Dafflon, B., Shiel, A., Tokunaga, T., Wan, J., Faybishenko, B., Dong, W., Williams, K.H. Hobson, C., Brown, S.T., Hubbard, S.S. (2018), Isotopic Measurement of the Spatial Variation of Vadose Infiltration to the Aquifer at the Rifle Site, CO, STOTEN
57. Lavy, A., D.G McGrath, P.M. Carnevali, J. Wan, W. Dong, T. Tokunaga, B.C. Thomas, K. Williams, S.S. Hubbard, J. F. Banfield, (2018) Microbial communities across a hillslope-riparian transect shaped by proximity to the stream, groundwater table, and weathered bedrock, *ISME*, 2018 <https://doi.org/10.1101/423368>
58. Taş, N., Prestat, E., Wang, S., Wu, Y., Ulrich, C., Kneafsey, T., Tringe, S.G., Torn, M.S., Hubbard, S.S., and Jansson, J.K., 2018, Landscape topography structures the soil microbiome in arctic polygonal tundra: *Nature Communications*, v. 9, doi: 10.1038/s41467-018-03089-z.

59. Peruzzo, L., Schmutz, M., Franceschi, M., Wu, Y., and Hubbard, S.S. (2018), The Relative Importance of Saturated Silica Sand Interfacial and Pore Fluid Geochemistry on the Spectral Induced Polarization Response: *Journal of Geophysical Research: Biogeosciences*, v. 123, p. 1702–1718, doi: 10.1029/2017jg004364.
60. Wu, Y., Ulrich, C., Kneafsey, T., Lopez, R., Chou, C., Geller, J., Mcknight, K., Dafflon, B., Soom, F., Peterson, J., and Hubbard, S.S. (2018), Depth-Resolved Physicochemical Characteristics of Active Layer and Permafrost Soils in an Arctic Polygonal Tundra Region: *Journal of Geophysical Research: Biogeosciences*, v. 123, p. 1366–1386, doi: 10.1002/2018jg004413.
61. Newcomer, M.E., Hubbard, S.S., Fleckenstein, J.H., Maier, U., Schmidt, C., Thullner, M., Ulrich, C., Flipo, N., and Rubin, Y. (2018), Influence of hydrological perturbations and riverbed sediment characteristics on hyporheic zone respiration of CO₂ and N₂: *Journal of Geophysical Research: Biogeosciences*, doi: 10.1002/2017jg004090.
62. Tran, A.P., Dafflon, B., Bisht, G., and Hubbard, S.S. (2018), Spatial and temporal variations of thaw layer thickness and its controlling factors identified using time-lapse electrical resistivity tomography and hydro-thermal modeling: *Journal of Hydrology*, v. 561, p. 751–763, doi: 10.1016/j.jhydrol.2018.04.028.
63. Wu, Y., Cheng, Y., Hubbard, C.G., Hubbard, S., and Ajo-Franklin, J.B. (2018), Biogenic sulfide control by nitrate and (per)chlorate – A monitoring and modeling investigation: *Chemical Geology*, v. 476, p. 180–190, doi: 10.1016/j.chemgeo.2017.11.016.
64. Wu, Y., Nakagawa, S., Kneafsey, T.J., Dafflon, B., and Hubbard, S. (2017), Electrical and seismic response of saline permafrost soil during freeze- Thaw transition: *Journal of Applied Geophysics*, v. 146, p. 16–26, doi: 10.1016/j.jappgeo.2017.08.008.
65. Dafflon, B., Oktem, R., Peterson, J., Ulrich, C., Tran, A. P., Romanovsky, V. and Hubbard, S. S. (2017), Coincident above- and below-ground autonomous monitoring to quantify co-variability in permafrost, soil and vegetation properties in Arctic Tundra, *Journal of Geophysical Research: Biogeosciences*, doi: 10.1002/2016jg003724.
66. Leger, E., Dafflon, B., Soom, F., Peterson, J., Ulrich, C., and Hubbard, S. (2017), Quantification of Arctic Soil and Permafrost Properties Using Ground-Penetrating Radar and Electrical Resistivity Tomography Datasets, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, p. 1–12, doi: 10.1109/jstars.2017.2694447.
67. Tran, A.P., Dafflon, B., and Hubbard, S. S. (2017), Coupled Land Surface-Subsurface Hydrogeophysical Inverse Modeling to Estimate Soil Organic Content and explore associated Hydrological and Thermal Dynamics in an Arctic Tundra, *The Cryosphere Discussions*, p. 1–42, doi: 10.5194/tc-2017-1.
68. Tran, A.P., Dafflon, B., and Hubbard, S.S. (2017) Coupled land surface–subsurface hydrogeophysical inverse modeling to estimate soil organic carbon content and explore associated hydrological and thermal dynamics in the Arctic tundra: *The Cryosphere*, v. 11, p. 2089–2109, doi: 10.5194/tc-11-2089-2017
69. Tsang, C., Lippmann, M., Dobson, P., Tsang, Y., Faybishenko, B., Benson, S., Birkholzer, J., Finsterle, S., Hawkes, D., Hubbard, S., Kneafsey, T., Liu, H., Oldenburg, C., Pruess, K., et al. (2017) Commemorating Dr. Gudmundur “Bo” Bodvarsson (1951–2006), a Leader of the Deep Unsaturated Flow and Transport Investigations: *Water*, v. 10, p. 18, doi: 10.3390/w10010018.
70. Dafflon, B., Oktem, R., Peterson, J., Ulrich, C., Tran, A. P., Romanovsky, V. and Hubbard, S. S. (2017), Coincident above- and below-ground autonomous monitoring to quantify co-variability in permafrost, soil and vegetation properties in Arctic Tundra, *Journal of Geophysical Research: Biogeosciences*, doi: 10.1002/2016jg003724.
71. Dafflon, B., Leger, E., Soom, F., Ulrich, C., Peterson, J., and Hubbard, S. (2016), Quantification of Arctic soil and permafrost properties using ground penetrating radar, 2016 Extended abstract, 16th International Conference on Ground Penetrating Radar (GPR), doi: 10.1109/icgpr.2016.7572663.
72. Wainwright, H. M., Liljedahl, A. K., Dafflon, B., Ulrich, C., Peterson, J. E., and Hubbard, S. S. (2016), Mapping snow depth within a tundra ecosystem using multiscale observations and Bayesian methods, *The Cryosphere Discussions*, p. 1–56, doi: 10.5194/tc-2016-168.
73. Anantharaman, K., Brown, C. T., Hug, L. A., Sharon, I., Castelle, C. J., Probst, A. J., Thomas, B. C., Singh, A., Wilkins, M. J., Karaoz, U., Brodie, E. L., Williams, K. H., Hubbard, S. S. and

- Banfield, J. F. (2016), Thousands of microbial genomes shed light on interconnected biogeochemical processes in an aquifer system, *Nature Communications*, v. 7, p. 13219, doi: 10.1038/ncomms13219
74. Arora, B., Dwivedi, D., Hubbard, S. S., Steefel, C. I., and Williams, K. H. (2016), Identifying geochemical hot moments and their controls on a contaminated river floodplain system using wavelet and entropy approaches, *Environmental Modelling & Software*, v. 85, p. 27–41, doi: 10.1016/j.envsoft.2016.08.005, 2016.
 75. Tokunaga, T. K., Kim, Y., Conrad, M. E., Bill, M., Hobson, C., Williams, K. H., Dong, W., Wan, J., Robbins, M. J., Long, P. E., Faybishenko, B., Christensen, J. N., and Hubbard, S. S. (2016), Deep Vadose Zone Respiration Contributions to Carbon Dioxide Fluxes from a Semiarid Floodplain, *Vadose Zone Journal*, v. 15, doi: 10.2136/vzj2016.02.0014.
 76. Tran, A. P., Dafflon, B., Kowalsky, M. B., Long, P., Tokunaga, T. K., Williams, K. H., and Hubbard, S. S. (2016), Quantifying Shallow Subsurface Water and Heat Dynamics using Coupled Hydrological-Thermal-Geophysical Inversion, *Hydrology and Earth System Sciences Discussions Hydrol. Earth Syst. Sci. Discuss.*, p. 1–39, doi: 10.5194/hess-2016-175.
 77. Long, P. E., Williams, K. H., Hubbard, S. S. and Banfield, J. F. (2016), Microbial Metagenomics Reveals Climate-Relevant Subsurface Biogeochemical Processes, *Trends in Microbiology*, doi:10.1016/j.tim.2016.04.006.
 78. Faybishenko, B., Hubbard, S. S., Brodie, E., Nico, P., Molz, F., Hunt, A. and Pachepsky, Y. (2016), Preface to the Special Issue of on Soil as Complex Systems, *Vadose Zone Journal*, 15(2), doi:10.2136/vzj2016.01.0005.
 79. Newcomer, M. E., Hubbard, S. S., Fleckenstein, J. H., Maier, U., Schmidt, C., Thullner, M., Ulrich, C., Flipo, N. and Rubin, Y. (2016), Simulating bioclogging effects on dynamic riverbed permeability and infiltration, *Water Resources Research*, doi:10.1002/2015wr018351.
 80. Tran, A. P., Dafflon, B. and Hubbard, S. S. (2016), iMatTOUGH: An open-source Matlab-based graphical user interface for pre- and post-processing of TOUGH2 and iTOUGH2 models, *Computers & Geosciences*, 89, 132–143, doi:10.1016/j.cageo.2016.02.006
 81. Wainwright, H. M., Orozco, A. F., Bucker, M., Dafflon, B., Chen, J., Hubbard, S. S. and Williams, K. H. (2016), Hierarchical Bayesian method for mapping biogeochemical hot spots using induced polarization imaging, *Water Resources Research*, 52(1), 533–551, doi:10.1002/2015wr017763
 82. Dafflon, B., Hubbard, S. S., Ulrich, C., Peterson, J. E., Wu, Y., Wainwright, H. M. and Kneafsey, T. J. (2016), Geophysical estimation of shallow permafrost distribution and properties in an ice-wedge polygon-dominated Arctic tundra region, *Geophysics*, 81(1), WA247–WA263, doi:10.1190/geo2015-0175.1.
 83. Chen, J. S., Hubbard, S. S., Williams, K. H. and Ficklin, D. L. (2016), Estimating groundwater dynamics at a Colorado River floodplain site using historical hydrological data and climate information, *Water Resources Research*, 52(3), 1881–1898, doi:10.1002/2015wr017777.
 84. Commer, M., Doetsch, J., Dafflon, B., Wu, Y., Daley, T. M. and Hubbard, S. S. (2016), Time-lapse 3-D electrical resistance tomography inversion for crosswell monitoring of dissolved and supercritical CO₂ flow at two field sites: Escatawpa and Cranfield, Mississippi, USA, *International Journal of Greenhouse Gas Control*, 49, 297–311, doi:10.1016/j.ijggc.2016.03.020.
 85. Ulrich, C., Hubbard, S. S., Florsheim, J., Rosenberry, D., Borglin, S., Trotta, M. and Seymour, D. (2015) Riverbed Clogging Associated with a California Riverbank Filtration System: An Assessment of Mechanisms and Monitoring Approaches, *Journal of Hydrology*, 526 (3), 1740-1753, doi: 10.1016/j.jhydrol.2015.08.012.
 86. Öktem, R., Dafflon, B., Peterson, J. E. and Hubbard, S. S. (2015), Monitoring Arctic landscape variation by pole and kite mounted cameras, *Image Processing: Machine Vision Applications VIII, Proc. of SPIE-IS&T Electronic Imaging*, SPIE, 9405,0940505, doi:10.1117/12.2083403.
 87. Binley, A., Hubbard, S. S., Huisman, J. A., Revil, A., Robinson, D. A., Singha, K., and Slater, L. D. (2015), The emergence of hydrogeophysics for improved understanding of subsurface processes over multiple scales, *Water Resources Research*, v. 51, p. 3837–3866, doi: 10.1002/2015wr017016

88. Newman, B. D., Throckmorton, H. M., Graham, D. E., Gu, B., Hubbard, S. S., Liang, L., Wu, Y., Heikoop, J. M., Herndon, E. M., Phelps, T. J., Wilson, C. J. and Wulfschleger, S. D. (2015), Microtopographic and depth controls on active layer chemistry in Arctic polygonal ground, *Geophysical Research Letters*, v. 42, p. 1808–1817, doi: 10.1002/2014gl062804.
89. Berryman, J., Kwon, T. H., Dou, S., Ajo-Franklin, J. and Hubbard, S. S. (2015), Analysis of laboratory data on ultrasonic monitoring of permeability reduction due to biopolymer formation in unconsolidated granular media, *Geophysical Prospecting*, v. 64, p. 445–455, doi: 10.1111/1365-2478.12295.
90. Wainwright, H. M., Dafflon, B., Smith, L. J., Hahn, M. S., Curtis, J. B., Wu, Y., Ulrich, C., Peterson, J. E., Torn, M. S. and Hubbard, S. S. (2015), Identifying multiscale zonation and assessing the relative importance of polygon geomorphology on carbon fluxes in an Arctic tundra ecosystem, *Journal of Geophysical Research: Biogeosciences*, v. 120, p. 788–808, doi: 10.1002/2014jg002799.
91. Wainwright, H. M., Chen, J., Sassen, D. S., and Hubbard, S. S. (2014), Bayesian hierarchical approach and geophysical data sets for estimation of reactive facies over plume scales, *Water Resources Research*, v. 50, p. 4564–4584, doi: 10.1002/2013wr013842.
92. Gangodagamage, C., Rowland, J. C., Hubbard, S. S., Brumby, S. P., Liljedahl, A. K., Wainwright, H., Wilson, Altmann, G. L., Dafflon, B., Peterson, J., Ulrich, C., Tweedie, C. E. and Wulfschleger, S. D. (2014), Extrapolating active layer thickness measurements across Arctic polygonal terrain using LiDAR and NDVI data sets, *Water Resources Research*, 1944-7973, doi:10.1002/2013WR014283.
93. Wu, Y., Surasani, V. K., Li, L. and Hubbard, S. S. (2014), Geophysical monitoring and reactive transport simulations of bioclogging processes induced by *Leuconostoc mesenteroides*, *Geophysics*, v. 79, doi: 10.1190/geo2013-0121.1.
94. Chen, J., Hubbard, S. S. and Williams, K. H. (2013), Data-driven approach to identify field-scale biogeochemical transitions using geochemical and geophysical data and hidden Markov models: Development and application at a uranium-contaminated aquifer, *Water Resources Research*, v. 49, p. 6412–6424, doi: 10.1002/wrcr.20524.
95. Surasani, V. K., Li, L., Ajo-Franklin, J. B., Hubbard, C., Hubbard, S. S. and Wu, Y. (2013), Bioclogging and Permeability Alteration by *L. mesenteroides* in a Sandstone Reservoir: A Reactive Transport Modeling Study, *Energy & Fuels*, v. 27, p. 6538–6551, doi: 10.1021/ef401446f.
96. Vilcáez, J., Li, L. and Hubbard, S. S. (2013), A new model for the biodegradation kinetics of oil droplets: application to the Deepwater Horizon oil spill in the Gulf of Mexico, *Geochemical Transactions*, v. 14, p. 4, doi: 10.1186/1467-4866-14-4.
97. Dafflon, B., Hubbard, S. S., Ulrich, C. and Peterson, J. E. (2013), Electrical Conductivity Imaging of Active Layer and Permafrost in an Arctic Ecosystem, through Advanced Inversion of Electromagnetic Induction Data, *Vadose Zone Journal*, v. 12, doi: 10.2136/vzj2012.0161.
98. Revil, A., Wu, Y., Karaoulis, M., Hubbard, S. S., Watson, D. B., and Eppehimer, J. D. (2013), Geochemical and geophysical responses during the infiltration of fresh water into the contaminated saprolite of the Oak Ridge Integrated Field Research Challenge site, Tennessee, *Water Resources Research*, v. 49, p. 4952–4970, doi: 10.1002/wrcr.20380.
99. Bea, S. A., Wainwright, H., Spycher, N., Faybishenko, B., Hubbard, S. S. and Denham, M.E. (2013), Identifying key controls on the behavior of an acidic-U(VI) plume in the Savannah River Site using reactive transport modeling, *Journal of Contaminant Hydrology*, v. 151, p. 34–54, doi: 10.1016/j.jconhyd.2013.04.005.
100. Truex, M., Johnson, T., Strickland, C., Peterson, J. and Hubbard, S.S. (2013), Monitoring Vadose Zone Desiccation with Geophysical Methods, *Vadose Zone Journal*, v. 12, doi: 10.2136/vzj2012.0147.
101. Vilcáez, J., Li, L., Wu, D. and Hubbard, S. S. (2013), Reactive Transport Modeling of Induced Selective Plugging by *Leuconostoc Mesenteroides* in Carbonate Formations, *Geomicrobiology Journal*, v. 30, p. 813–828, doi: 10.1080/01490451.2013.774074.
102. Revil, A., Skold, M., Karaoulis, M., Schmutz, M., Hubbard, S. S., Mehlhorn, T. L. and Watson, D. B. (2013), Hydrogeophysical investigations of the former S-3 ponds contaminant plumes, Oak Ridge Integrated Field Research Challenge site, Tennessee, *Geophysics*, v. 78, doi: 10.1190/geo2012-0177.1.

103. Revil, A., Skold, M., Hubbard, S. S., Wu, Y., Watson, D. B. and Karaoulis, M. (2013), Petrophysical properties of saprolites from the Oak Ridge Integrated Field Research Challenge site, Tennessee, *Geophysics*, v. 78, doi: 10.1190/geo2012-0176.1.
104. Trautz, R. C., Pugh, J. D., Varadharajan, C., Zheng, L., Bianchi, M., Nico, P. S., Spycher, N. F., Newell, D. L., Esposito, R. A., Wu, Y., Dafflon, B., Hubbard, S. S. and Birkholzer, J. T. (2013), Effect of Dissolved CO₂ on a Shallow Groundwater System: A Controlled Release Field Experiment, *Environmental Science & Technology*, v. 47, p. 298–305, doi: 10.1021/es301280t.
105. Hubbard, S. S., Gangodagamage, C., Dafflon, B., Wainwright, H., Peterson, J., Gusmeroli, A., Ulrich, C., Wu, Y., Wilson, C., Rowland, J., Tweedie, C., and Wulfschleger, S. D. (2012), Quantifying and relating land-surface and subsurface variability in permafrost environments using LiDAR and surface geophysical datasets, *Hydrogeology Journal*, v. 21, p. 149–169, doi: 10.1007/s10040-012-0939-y.
106. Gasperikova, E., Hubbard, S. S., Watson, D. B., Baker, G. S., Peterson, J. E., Kowalsky, M. B., Smith, M., and Brooks, S. (2012), Long-term electrical resistivity monitoring of recharge-induced contaminant plume behavior, *Journal of Contaminant Hydrology*, v. 142-143, p. 33–49, doi: 10.1016/j.jconhyd.2012.09.007.
107. Dafflon, B., Wu, Y., Hubbard, S. S., Birkholzer, J. T., Daley, T. M., Pugh, J. D., Peterson, J. E. and Trautz, R. C. (2013), Monitoring CO₂ Intrusion and Associated Geochemical Transformations in a Shallow Groundwater System Using Complex Electrical Methods, *Environmental Science & Technology*, v. 47, p. 314–321, doi: 10.1021/es301260e.
108. Wu, Y., Hubbard, S. S., Ulrich, C., and Wulfschleger, S. D. (2013), Remote Monitoring of Freeze–Thaw Transitions in Arctic Soils Using the Complex Resistivity Method, *Vadose Zone Journal*, v. 12, doi: 10.2136/vzj2012.0062.
109. Meyer, J., Bethel, E. W., Horsman, J. L., Hubbard, S. S., Krishnan, H., Romosan, A., Keating, E. H., Monroe, L., Strelitz, R., Moore, P., Taylor, G., Torkian, B., Johnson, T. C. and Gorton, I. (2012), Visual Data Analysis as an Integral Part of Environmental Management, *IEEE Transactions on Visualization and Computer Graphics*, v. 18, p. 2088–2094, doi: 10.1109/tvcg.2012.278.
110. Jadoon, K. Z., Weihermüller, L., Scharnagl, B., Kowalsky, M. B., Bechtold, M., Hubbard, S. S., Vereecken, H. and Lambot, S. (2012), Estimation of Soil Hydraulic Parameters in the Field by Integrated Hydrogeophysical Inversion of Time-Lapse Ground-Penetrating Radar Data, *Vadose Zone Journal*, v. 11, doi: 10.2136/vzj2011.0177.
111. Sassen, D. S., Hubbard, S. S., Bea, S. A., Chen, J., Spycher, N. and Denham, M. E. (2012), Reactive facies: An approach for parameterizing field-scale reactive transport models using geophysical methods, *Water Resources Research*, v. 48, doi: 10.1029/2011wr011047.
112. Wu, Y., Hubbard, S. S. and Wellman, D. (2012), Geophysical Monitoring of Foam Used to Deliver Remediation Treatments within the Vadose Zone, *Vadose Zone Journal*, v. 11, doi: 10.2136/vzj2011.0160.
113. Kowalsky, M. B., Finsterle, S., Williams, K. H., Murray, C., Commer, M., Newcomer, D., Englert, A., Steefel, C. I. and Hubbard, S. S. (2012), On parameterization of the inverse problem for estimating aquifer properties using tracer data, *Water Resources Research*, v. 48, doi: 10.1029/2011wr011203.
114. Chen, J., Hubbard, S. S., Williams, K. H., Orozco, A. F. and Kemna, A. (2012), Estimating the spatiotemporal distribution of geochemical parameters associated with biostimulation using spectral induced polarization data and hierarchical Bayesian models, *Water Resources Research*, v. 48, doi: 10.1029/2011wr010992.
115. Li, M., Yang, D., Chen, J. and Hubbard, S. S. (2012), Calibration of a distributed flood forecasting model with input uncertainty using a Bayesian framework, *Water Resources Research*, v. 48, doi: 10.1029/2010wr010062.
116. Wan, J., Tokunaga, T. K., Dong, W., Denham, M. E. and Hubbard, S. S. (2012), Persistent Source Influences on the Trailing Edge of a Groundwater Plume, and Natural Attenuation Timeframes: The F-Area Savannah River Site, *Environmental Science & Technology*, v. 46, p. 4490–4497, doi: 10.1021/es204265q.
117. Orozco, A., Williams, K. H., Long, P. E., Hubbard, S. S. and Kemna, A. (2011), Using complex resistivity imaging to infer biogeochemical processes associated with bioremediation of an

- uranium-contaminated aquifer, *Journal of Geophysical Research*, v. 116, doi: 10.1029/2010jg001591.
118. Commer, M., Newman, G. A., Williams, K. H., and Hubbard, S. S. (2011), 3D induced-polarization data inversion for complex resistivity, *Geophysics*, v. 76, doi: 10.1190/1.3560156.
 119. Kowalsky, M. B., Gasperikova, E., Finsterle, S., Watson, D., Baker, G., and Hubbard, S. S. (2011), Coupled modeling of hydrogeochemical and electrical resistivity data for exploring the impact of recharge on subsurface contamination, *Water Resources Research*, v. 47, doi: 10.1029/2009wr008947.
 120. Williamson, M., Meza, J., Moulton, D., Gorton, I., Freshley, M., Dixon, P., Seitz, R., Steefel, C., Finsterle, S., Hubbard, S. S., Zhu, M., Gerdes, K., Patterson, R. and Collazo, Y.T. (2011), Advanced Simulation Capability for Environmental Management (Ascem): An Overview Of Initial Results, *Technology & Innovation*, v. 13, p. 175–199, doi: 10.3727/194982411x13085939956625.
 121. Wu, Y., Ajo-Franklin, J. B., Spycher, N., Hubbard, S. S., Zhang, G., Williams, K. H., Taylor, J., Fujita, Y., and Smith, R. (2011), Geophysical monitoring and reactive transport modeling of ureolytically-driven calcium carbonate precipitation: *Geochemical Transactions*, v. 12, p. 7, doi: 10.1186/1467-4866-12-7. (
 122. Scheibe, T. D., Hubbard, S. S., Onstott, T. C., and DeFlaun, M. F. (2011), Lessons Learned from Bacterial Transport Research at the South Oyster Site, *Ground Water*, v. 49, p. 745–763, doi: 10.1111/j.1745-6584.2011.00831.x.
 123. Li, L., Gawande, N., Kowalsky, M.B., Steefel, C.I., and Hubbard, S.S. (2011), Physicochemical Heterogeneity Controls on Uranium Bioreduction Rates at the Field Scale, *Environmental Science & Technology*, v. 45, p. 9959–9966, doi: 10.1021/es201111y
 124. Zhang, Y., Hubbard, S., and Finsterle, S. (2010), Factors Governing Sustainable Groundwater Pumping near a River, *Ground Water*, v. 49, p. 432–444, doi: 10.1111/j.1745-6584.2010.00743.x.
 125. Chen, J., Hubbard, S. S., Gaines, D., Korneev, V., Baker, G., and Watson, D. (2010), Stochastic estimation of aquifer geometry using seismic refraction data with borehole depth constraints, *Water Resources Research*, v. 46, doi: 10.1029/2009wr008715.
 126. Hubbard, S.S., (2010), Environmental Geophysics for Contaminant Remediation, Chapter 10.5 in *Subsurface Sensing Technologies*.
 127. Hubbard, S.S. et al., (2010), Understanding Vineyard Soils, *Vadose Zone Journal*, v. 9, p. 1107, doi: 10.2136/vzj2010.0084br.
 128. Grote, K., Anger, C., Kelly, B., Hubbard, S. S., and Rubin, Y. (2010), Characterization of Soil Water Content Variability and Soil Texture using GPR Groundwave Techniques, *Journal of Environmental & Engineering Geophysics*, v. 15, p. 93–110, doi: 10.2113/jeege15.3.93.
 129. Williams, K. H., N'guessan, A. L., Druhan, J., Long, P. E., Hubbard, S. S., Lovely, D. R., and Banfield, J. F. (2010), Electrodeic voltages accompanying stimulated bioremediation of a uranium-contaminated aquifer, *Journal of Geophysical Research: Biogeosciences*, v. 115, doi: 10.1029/2009jg001142.
 130. Lambot, S., Pettinelli, E., Hubbard, S. S. and Slob, E. (2010), Ground Penetrating Radar in Hydrogeophysics, S., Chapter 10.4 in *Subsurface Sensing Technologies*.
 131. Hubbard, S.S., and Linde, N., *Hydrogeophysics* (2010), Chapter 20 in *Treatise in Water Science*, Volume 2, Ed. S. Uhlenbrook, Elsevier.
 132. Revil, A., Mendonça, C. A., Atekwana, E. A., Kulesa, B., Hubbard, S. S., and Bohlen, K. J., 2010, Understanding biogeobatteries: Where geophysics meets microbiology, *Journal of Geophysical Research*, v. 115, doi: 10.1029/2009jg001065.
 133. Hubbard, S. S., Peterson, J. , Wolf, J., Freese, P., Hubbard, A., and Rubin, Y. (2010), Advanced datasets guide Vineyard Development, *Practical Winery and Vineyard*.
 134. Li, L., Steefel, C. I., Kowalsky, M. B., Englert, A., and Hubbard, S. S. (2010), Effects of physical and geochemical heterogeneities on mineral transformation and biomass accumulation during biostimulation experiments at Rifle, Colorado, *Journal of Contaminant Hydrology*, v. 112, p. 45–63, doi: 10.1016/j.jconhyd.2009.10.006.

135. Wu, Y., Hubbard, S., Williams, K. H., and Ajo-Franklin, J. (2010), On the complex conductivity signatures of calcite precipitation, *Journal of Geophysical Research: Biogeosciences*, v. 115, doi: 10.1029/2009jg001129
136. Williams, K. H., Kemna, A., Wilkins, M. J., Druhan, J., Arntzen, E., N'Guessan, A. L., Long, P. E., Hubbard, S. S., and Banfield, J. F. (2009), Geophysical Monitoring of Coupled Microbial and Geochemical Processes During Stimulated Subsurface Bioremediation, *Environmental Science & Technology*, v. 43, p. 6717–6723, doi: 10.1021/es900855j.
137. Chen, J., Hubbard, S. S., Williams, K. H., Pride, S., Li, L., Steefel, C., and Slater, L. (2009), A state-space Bayesian framework for estimating biogeochemical transformations using time-lapse geophysical data, *Water Resources Research*, v. 45, doi: 10.1029/2008wr007698.
138. Englert, A., Hubbard, S. S., Williams, K. H., Li, L., and Steefel, C. I. (2009), Feedbacks Between Hydrological Heterogeneity and Bioremediation Induced Biogeochemical Transformations, *Environmental Science & Technology*, v. 43, p. 5197–5204, doi: 10.1021/es803367n.
139. Li, L., Steefel, C. I., Williams, K. H., Wilkins, M. J., and Hubbard, S. S. (2009), Mineral Transformation and Biomass Accumulation Associated with Uranium Bioremediation at Rifle, Colorado, *Environmental Science & Technology*, v. 43, p. 5429–5435, doi: 10.1021/es900016v.
140. Chen, J., Kemna, A., and Hubbard, S. S. (2008), A comparison between Gauss-Newton and Markov-chain Monte Carlo–based methods for inverting spectral induced-polarization data for Cole-Cole parameters, *Geophysics*, v. 73, doi: 10.1190/1.2976115.
141. Faybishenko, B., Hazen, T. C., Long, P. E., Brodie, E. L., Conrad, M. E., Hubbard, S. S., Christensen, J. N., Joyner, D., Borglin, S. E., Chakraborty, R., Williams, K. H., Peterson, J. E., Chen, J., Brown, S. T., et al. (2008), In Situ Long-Term Reductive Bioimmobilization of Cr(VI) in Groundwater Using Hydrogen Release Compound, *Environmental Science & Technology*, v. 42, p. 8478–8485, doi: 10.1021/es801383r.
142. Druhan, J. L., Conrad, M. E., Williams, K. H., N'Guessan, L., Long, P. E., and Hubbard, S. S. (2008), Sulfur Isotopes as Indicators of Amended Bacterial Sulfate Reduction Processes Influencing Field Scale Uranium Bioremediation, *Environmental Science & Technology*, v. 42, p. 7842–7849, doi: 10.1021/es800414s.
143. Hubbard, S. S. et al (2008), The evolution of hydrogeophysics, *The Leading Edge*, v. 27, p. 824–824, doi: 10.1190/tle27060824.1.
144. Hubbard, S. S., Williams, K., Conrad, M. E., Faybishenko, B., Peterson, J., Chen, J., Long, P., and Hazen, T. (2008), Geophysical Monitoring of Hydrological and Biogeochemical Transformations Associated with Cr(VI) Bioremediation, *Environmental Science & Technology*, v. 42, p. 3757–3765, doi: 10.1021/es071702s.
145. Lambot, S., Binley, A., Slob, E., and Hubbard, S. (2008), Ground Penetrating Radar in Hydrogeophysics, *Vadose Zone Journal*, v. 7, p. 137, doi: 10.2136/vzj2007.0180.
146. Personna, Y. R., Ntarlagiannis, D., Slater, L., Yee, N., O'brien, M. and Hubbard, S. (2008), Spectral induced polarization and electrodic potential monitoring of microbially mediated iron sulfide transformations, *Journal of Geophysical Research: Biogeosciences*, v. 113, doi: 10.1029/2007jg000614.
147. Linde, N., Tryggvason, A., Peterson, J. E. and Hubbard, S. S. (2008), Joint inversion of crosshole radar and seismic traveltimes acquired at the South Oyster Bacterial Transport Site, *Geophysics*, v. 73, doi: 10.1190/1.2937467.
148. Slater, L., Ntarlagiannis, D., Personna, Y. R., and Hubbard, S. S. (2007), Pore-scale spectral induced polarization signatures associated with FeS biomineral transformations, *Geophysical Research Letters*, v. 34, doi: 10.1029/2007gl031840.
149. Williams, K. H., Hubbard, S. S. and Banfield, J. F. (2007), Galvanic interpretation of self-potential signals associated with microbial sulfate-reduction, *Journal of Geophysical Research: Biogeosciences*, v. 112, doi: 10.1029/2007jg000440.
150. Snieder, R., Hubbard, S., Haney, M., Bawden, G., Hatchell, P., Revil, A. and DOE Geophysical Monitoring Working Group (2007), Advanced Noninvasive Geophysical Monitoring Techniques: Annual Review of Earth and Planetary Sciences, v. 35, p. 653–683, doi: 10.1146/annurev.earth.35.092006.145050

151. Chen, J., Hubbard, S. S., Peterson, J., Williams, K., Fienen, M., Jardine, P., and Watson, D. (2006), Development of a joint hydrogeophysical inversion approach and application to a contaminated fractured aquifer, *Water Resources Research*, v. 42, doi: 10.1029/2005wr004694
152. Scheibe, T. D., Fang, Y., Murray, C. J., Roden, E. E., Chen, J., Chien, Y. J., Brooks, S. C. and Hubbard, S. S. (2006), Transport and biogeochemical reaction of metals in a physically and chemically heterogeneous aquifer, *Geosphere*, v. 2, p. 220, doi: 10.1130/ges00029.1.
153. Hubbard, S. S., Valeo, C. and S. Uhlenbrook (2006), *Hydrological Challenges: Scientific, Technological and Organizational Bottlenecks*, Chapter 7, *Hydrology 2020: An Integrating Science to Meet World Water Challenges*, IAHS Press, UK, Publication 300, ISBN 978-901502-33-3, ISSN 0144-7815, p. 141-154.
154. Kowalsky, M. B., Chen, J. and Hubbard, S. S. (2006), Joint inversion of geophysical and hydrological data for improved subsurface characterization, *The Leading Edge*, v. 25, p. 730–734, doi: 10.1190/1.2210057
155. Linde, N., Finsterle, S. and Hubbard, S. S. (2006), Inversion of tracer test data using tomographic constraints, *Water Resources Research*, v. 42, doi: 10.1029/2004wr003806.
156. Hubbard, S. S. and Hornberger, G. (2006), Introduction to special section on Hydrologic Synthesis, *Water Resources Research*, v. 42, doi: 10.1029/2005wr004815.
157. Ntarlagiannis, D., Williams, K. H., Slater, L. and Hubbard, S. S. (2005), Low-frequency electrical response to microbial induced sulfide precipitation, *Journal of Geophysical Research: Biogeosciences*, v. 110, doi: 10.1029/2005jg000024.
158. Kowalsky, M. B., Finsterle, S., Peterson, J., Hubbard, S. S., Rubin, Y., Majer, E., Ward, A. and Gee, G. (2005), Estimation of field-scale soil hydraulic and dielectric parameters through joint inversion of GPR and hydrological data, *Water Resources Research*, v. 41, doi: 10.1029/2005wr004237
159. Williams, K. H., Ntarlagiannis, D., Slater, L. D., Dohnalkova, A., Hubbard, S. S. and Banfield, J. F. (2005), Geophysical Imaging of Stimulated Microbial Biomineralization, *Environmental Science & Technology*, v. 39, p. 7592–7600, doi: 10.1021/es0504035.
160. Grote, K., Hubbard, S. S., Harvey, J. and Rubin, Y. (2005), Evaluation of infiltration in layered pavements using surface GPR reflection techniques, *Journal of Applied Geophysics*, v. 57, p. 129–153, doi: 10.1016/j.jappgeo.2004.10.002.
161. Lunt, I., Hubbard, S. and Rubin, Y. (2005), Soil moisture content estimation using ground-penetrating radar reflection data, *Journal of Hydrology*, v. 307, p. 254–269, doi: 10.1016/j.jhydrol.2004.10.014.
162. Chen, J., Hubbard, S. S., Rubin, Y., Murray, C., Roden, E., and Majer, E. (2004), Geochemical characterization using geophysical data and Markov Chain Monte Carlo methods: A case study at the South Oyster bacterial transport site in Virginia, *Water Resources Research*, v. 40, doi: 10.1029/2003wr002883.
163. Vereecken, H., Hubbard, S. S., Binley, A., and Ferre, T. (2004), Hydrogeophysics: An Introduction from the Guest Editors, *Vadose Zone Journal*, v. 3, p. 1060–1062, doi: 10.2113/3.4.1060.
164. Hubbard, S. S. and Rubin, Y. (2004), The Quest for Better Wine using Geophysics, *Geotimes*, 30-34.
165. Huisman, J. A., Hubbard, S. S., Redman, J. D., and Annan, A. P. (2003), Measuring Soil Water Content with Ground Penetrating Radar, (2003) *Vadose Zone Journal*, v. 2, p. 476, doi: 10.2136/vzj2003.0476.
166. Grote, K., Hubbard, S. S., and Rubin, Y. (2003), Field-scale estimation of volumetric water content using ground-penetrating radar ground wave techniques, *Water Resources Research*, v. 39, doi: 10.1029/2003wr002045.
167. Hubbard, S. S., Zhang, J., Monteiro, P. J. M., Peterson, J. E. and Rubin, Y. (2003), Experimental Detection of Reinforcing Bar Corrosion Using Nondestructive Geophysical Techniques, *ACI Materials Journal*, v. 100, doi: 10.14359/12957.
168. Hubbard, S. S. and Rubin, Y. (2002), Study institute assesses the state of hydrogeophysics: Eos, *Transactions American Geophysical Union*, v. 83, p. 602, doi: 10.1029/2002eo000412.

169. Hubbard, S. S., Grote, K. and Rubin, Y. (2002), Mapping the volumetric soil water content of a California vineyard using high-frequency GPR ground wave data, *The Leading Edge*, v. 21, p. 552–559, doi: 10.1190/1.1490641.
170. Grote, K., Hubbard, S. S., and Rubin, Y. (2002), GPR monitoring of volumetric water content in soils applied to highway construction and maintenance, *The Leading Edge*, v. 21, p. 482–504, doi: 10.1190/1.1481259.
171. Balkwill, D., Chen, J., Deflaun, M., Dobbs, F., Dong, H., Fredrickson, J., Fuller, M., Green, M., Ginn, T., Griffin, T., Holben, W., Hubbard, S. S., Johnson, W., Long, P., et al. (2001), Breakthroughs in field-scale bacterial transport: Eos, *Transactions American Geophysical Union*, v. 82, p. 417–417, doi: 10.1029/01eo00255.
172. Hubbard, S. S., Chen, J., Peterson, J., Majer, E. L., Williams, K. H., Swift, D. J., Mailloux, B. and Rubin, Y. (2001), Hydrogeological characterization of the south oyster bacterial transport site using geophysical data, *Water Resources Research*, v. 37, p. 2431–2456, doi: 10.1029/2001wr000279
173. Chen, J., Hubbard, S. and Rubin, Y. (2001), Estimating the hydraulic conductivity at the south oyster site from geophysical tomographic data using Bayesian Techniques based on the normal linear regression model, *Water Resources Research*, v. 37, p. 1603–1613, doi: 10.1029/2000wr900392.
174. Balkwill, D., et al. (2001), Breakthroughs in field-scale bacterial transport, *Eos Trans. AGU*, 82(38), 417– 425, doi: 10.1029/01EO00255.
175. Johnson, P., Zhang, P., Fuller, M. E., Scheibe, T. D., Mailloux, B. J., Onstott, T. C., Deflaun, M. F., Hubbard, S. S., Radtke, J., Kovacik, W. P. and Holben, W. (2001), Ferrographic Tracking of Bacterial Transport in the Field at the Narrow Channel Focus Area, *Oyster, VA, Environmental Science & Technology*, v. 35, p. 182–191, doi: 10.1021/es001170e.
176. Hubbard, S. S. and Rubin, Y. (2000), Hydrogeological parameter estimation using geophysical data: a review of selected techniques, *Journal of Contaminant Hydrology*, v. 45, p. 3–34, doi: 10.1016/s0169-7722(00)00117-0.
177. Hubbard, S. S., Rubin, Y. and Majer, E. (1999), Spatial correlation structure estimation using geophysical and hydrogeological data, *Water Resources Research*, v. 35, p. 1809–1825, doi: 10.1029/1999wr900040.
178. Hubbard, S. S., Peterson, J. E., Majer, E. L., Zawislanski, P. T., Williams, K. H., Roberts, J. and Wobber, F. (1997), Estimation of permeable pathways and water content using tomographic radar data: *The Leading Edge*, v. 16, p. 1623–1630, doi: 10.1190/1.1437539.
179. Hubbard, S. S., Rubin, Y. and Majer, E. (1997), Ground-penetrating-radar-assisted saturation and permeability estimation in bimodal systems, *Water Resources Research*, v. 33, p. 971–990, doi: 10.1029/96wr03979
180. Hubbard, S. S., Çoruh, C. and Costain, J. K. (1991), Paleozoic and Grenvillian Structures in the southern Appalachians: Extended interpretation of seismic reflection data, *Tectonics*, v. 10, p. 141–170, doi: 10.1029/90tc01854.

Books, Book Chapters and Significant Published Reports

181. Wainwright, H. M., Arora, B., Faybishenko, B., Molins, S., Hubbard, S.S., Lipnikov, K., Moulton, D., Flach, G., Eddy-Dilek, C., Denham, M. (2018), Chapter 38: Sustainable Remediation in Complex Geologic Systems, in *The Heaviest Metals: Science and Technology of the Actinides and Beyond*, W. J. Evans and T. Hanusa (eds.), John Wiley & Sons.
182. Cantor, A., Kiparsky, M., Kennedy, R., Hubbard, S., Bales, R., Cano Pecharroman, L., Guivetchi, K., McCready, C. and Darling, G. (2018) *Data for Water Decision Making: Informing the Implementation of California’s Open and Transparent Water Data Act through Research and Engagement*. Center for Law, Energy & the Environment, UC Berkeley School of Law, Berkeley, CA. 56 pp. doi:10.15779/J28H01
183. Hubbard, S. S. (2011), Contaminant remediation, Chapter 9.4 in *Subsurface Sensing*, Eds. A. Turk et al., ISBN: 978-0-470-13388-0, Wiley, New Jersey, USA, p.600-618.
184. Lambot, S., Pettineli, Hubbard, S. S., Slob, E. C., Bleinm, E., Post, V. E. (2011), Hydrogeophysics, Chapter 9.3, *Subsurface Sensing*, Eds. A. Turk et al., ISBN 978-0-470-13388-0, Wiley, New Jersey, USA, p. 567-599.

185. Hubbard, S. S. and Linde, N. (2011), Hydrogeophysics. In: Peter Wilderer (ed.) Treatise on Water Science, vol. 1, pp. 401–434 Oxford: Academic Press.
186. Gaines, D., Baker, G. S., Hubbard, S. S., Watson, D., Brooks, S. and Jardine, P. (2010), 25. Detecting Perched Water Bodies Using Surface-Seismic Time-Lapse Traveltime Tomography, *Advances in Near-surface Seismology and Ground-penetrating Radar*, p. 415–428, doi: 10.1190/1.9781560802259.ch25.
187. Linde, N., Chen, J., Kowalsky, J. and Hubbard, S. S., (2006), Hydrogeophysical parameter estimation approaches for field scale characterization, in *Applied Hydrogeophysics*, edited by H. Vereecken et al., chap. 2, pp. 9-44, Springer.
188. Hubbard, S. and Rubin, Y., (2006), Hydrogeological Characterization Using Geophysical Methods: The Handbook of Groundwater Engineering, Second Edition, doi: 10.1201/9781420006001.ch14.
189. Hubbard, S. S., Lunt, I., Grote, K. and Y, Rubin (2006), Vineyard soil water content: mapping small scale variability using ground penetrating radar, Chapter in Macqueen, R.W., and Meinert, L.D., (eds.), *Fine Wine and Terroir- The Geoscience Perspective: Geoscience Canada Reprint Series Number 9*, Geological Association of Canada, St. John's, Newfoundland, 247p.. ISBN 1-897095-21-X; ISSN 0821-381X.
190. Majer, E. et al., 2005, *Airborne and Surface Geophysical Method Verification: Barrier Systems for Environmental Contaminant Containment and Treatment*, p. 209–285, doi: 10.1201/9781420037319.ch4.
191. Heal, K., Valeo, C., Oki, T. and Hubbard, S. S. (2006), Intersection of Hydrology and Other Disciplines, Chapter 6, *Hydrology 2020: an integrating science to meet world water challenges*: Wallingford, UK, International Association of Hydrological Sciences
192. Uhlenbrook, S., Franks, Stewart, F., Heal, K., Hubbard, S. S., Karambiri, H., Oki, T. and Valeo, C. (2006), Key Messages, Recommendations and Concluding Remarks, Chapter 8, *Hydrology 2020: an integrating science to meet world water challenges*: Wallingford, UK, International Association of Hydrological Sciences.
193. Rubin, Y., and Hubbard, S. S. (2005), Stochastic Forward and Inverse Modeling: The “Hydrogeophysical” Challenge: *Water Science and Technology Library Hydrogeophysics*, p. 487–511, doi: 10.1007/1-4020-3102-5_17.
194. Hubbard, S. S. and Rubin, Y. (2005), Introduction to Hydrogeophysics: *Water Science and Technology Library Hydrogeophysics*, p. 3–21, doi: 10.1007/1-4020-3102-5_1.
195. Faybishenko, B., Bandurranga, M., Conrad, M., Cook, P., Eddy-Dilek, C., Everett, L., Hazen, T., Hubbard, S. S., Hutter, A. R., Jordan, P., Keller, C., Leiji, F. J., Loaiciga, N., Majer, E. L., et al. (2000) *Vadose Zone Characterization and Monitoring Current Technologies, Applications, and Future Developments*, in *Vadose Zone Science and Technology Solutions*, p. 133–395.
196. Hubbard, S. S., Rubin, Y. and Majer, E.L. (1998), Estimation of hydrological parameters and their spatial Correlation structures using geophysical data, in *Groundwater Quality: Remediation and Protection*, eds. M. Herberet and K. Kovar, IAHS Publication 250, Wallingford,
197. Rubin, Y., Hubbard, S. S., Wilson, A. and Cushey, M. (1998), *Aquifer Characterization: The Handbook of Groundwater Engineering*, doi: 10.1201/9781420048582.ch10a.
198. Calzia, J. P., Hubbard, S. S., Turner, R. L., Griscom, A., Swatzky, D. L., Linne, J. M. (1988), *Mineral Resources of the Jordan Craters Wilderness Study Area Malheur County, Oregon*, U.S.G.S. Open-File Report 88-572, 11p.
199. Sharpless (maiden name), S. and Walters, A. (1989), *Data report for the 1986 San Luis Obispo, California, seismic refraction survey*, U.S.G.S. Open File Report 88-35, 48p
200. Sharpless (maiden name), S. and Albers, A. (1987), *A Compilation of ages of mineralization of metallic mineral deposits in the western conterminous Cordillera as determined through 1985*, U.S.G.S. Open File Report 87-165, 28p