

Curriculum Vitae
Haruko Murakami Wainwright

EDUCATION

Ph.D. 2010: University of California-Berkeley, Dept. of Nuclear Engineering

M.A. 2010: University of California-Berkeley, Dept. of Statistics

M.S. 2006: University of California-Berkeley, Dept. of Nuclear Engineering

B.S. 2003: Kyoto University (Kyoto, Japan), Dept. of Engineering Physics

PROFESSIONAL POSITIONS

2022 – : Massachusetts Institute of Technology, Assistant Professor

2021 – 2022: Lawrence Berkeley National Laboratory, Staff scientist

2018 – 2022: University of California, Berkeley, Associate Adjunct Professor

2014 – 2021: Lawrence Berkeley National Laboratory, Research scientist

2011 – 2014: Lawrence Berkeley National Laboratory, Postdoctoral fellow

AWARDS

- 2021 [RemPlex Summit](#), Best Presentation Award, 2021

- 2021 Waste Management Symposium, “Papers of Notes” Award, 2021.

- 2021 Waste Management Symposium, Superior Paper Award, 2021.

- 2019 LBNL Best Mentor Award, Lawrence Berkeley National Laboratory, 2019

- 2019 Waste Management Symposium, Superior Paper Award, 2019.

- 2017 R&D 100 Award, National Risk Assessment Partnership Toolset, 2017.

- 2017 Waste Management Symposium, Superior Paper Award, 2017.

- 2016 LBNL Director’s Award for Early Career Scientific Achievement, 2016.

- 2012 Director's Achievement Awards for Exceptional Tech Transfer Achievement (as a part of the TOUGH2 development team), 2012.

- Tenth International Conference on Permafrost young researcher travel grant award, 2012.

- Tenth International Conference on Permafrost NSF travel grant award, 2012.

- Student travel fellowship for the U.S. Department of Energy, Subsurface Biogeochemical Research 5th Annual PI Meeting, 2010.

- Student travel fellowship for the U.S. Department of Energy, Environmental Remediation Science Program 4th Annual PI Meeting, 2009.

- Roy G. Post Foundation Scholarship, 2009.

- Jane-Lewis Fellowship, 2006-2007 and 2007-2008.

- Japan Atomic Energy Society international student exchange program, 2004.

JOURNAL PUBLICATIONS AND BOOK CHAPTERS

66 publications, 1484 citations and H-index 19 in Google Scholar

1. Feldman, D. R., Worden, M., Falco, N., Dennedy-Frank, P. J., Chen, J., Dafflon, B., & Wainwright, H. (2022). Three-Dimensional Surface Downwelling Longwave Radiation Clear-Sky Effects in the Upper Colorado River Basin. *Geophysical Research Letters*, 49(4), e2021GL094605.
2. Dwivedi 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 Letter*, <https://doi.org/10.1088/1748-9326/ac59a9>
3. Lavin, A, Wainwright, H.M., et al., (2021). Simulation Intelligence: Towards a New Generation of Scientific Methods. arXiv preprint arXiv:2112.03235.
4. Zavarin, M., Chang, E., **Wainwright, H.**, Parham, N., Kaukuntla, R., Zouabe, J., ... & Brendler, V. (2022). Community Data Mining Approach for Surface Complexation Database Development. *Environmental Science & Technology*.
5. Wainwright, H. M., Uhlemann, S., Franklin, M., Falco, N., Bouskill, N. J., Newcomer, M. E., Dafflon, B., Siirilla-Woodburn, E.R., Minsley B.J., Williams, K.H. & Hubbard, S. S. (2022). Watershed zonation through hillslope clustering for tractably quantifying above-and below-ground watershed heterogeneity and functions. *Hydrology and Earth System Sciences*, 26(2), 429-444.
6. S. Uhlemann, B. Dafflon, **H. M. Wainwright**, K. H. Williams, B. J. Minsley, K. D. Zamudio, B. Carr, N. Falco, C. Ulrich, S. S. Hubbard, Revealing covariance of below and above-ground variability across a mountainous watershed using machine learning and airborne EM data, accepted, *Scientific Advances*
7. Xu, Z., Serata, R., Wainwright, H., Denham, M., Molins, S., Gonzalez-Raymat, H., ... & Eddy-Dilek, C. (2022). Reactive transport modeling for supporting climate resilience at groundwater contamination sites. *Hydrology and Earth System Sciences*, 26(3), 755-773.
8. Maina, F. Z., Wainwright, H. M., Dennedy-Frank, P. J., & Siirila-Woodburn, E. R. (2021). On the similarity of hillslope hydrologic function: a process-based approach. *Hydrology and Earth System Sciences Discussions*, 1-45.
9. Pion-Tonachini, L., Bouchard, K., Martin, H. G., Peisert, S., Holtz, W. B., Aswani, A., Wainwright, H.M., & Brown, J. B. (2021). Learning from learning machines: a new generation of AI technology to meet the needs of science. arXiv preprint arXiv:2111.13786.
10. Jiang P, Meinert N, Jordão H, Weisser C, Holgate S, Lavin A, Lütjens B, Newman D, Wainwright H, Walker C, Barnard P. Digital Twin Earth--Coasts: Developing a fast and physics-informed surrogate model for coastal floods via neural operators. arXiv preprint arXiv:2110.07100. 2021.
11. Li, W., Wainwright, H. M., Yan, Q., Zhou, H., Dafflon, B., Wu, Y., ... & Tartakovsky, D. M. Estimation of evapotranspiration rates and root water uptake profiles from soil moisture sensor array data. *Water Resources Research*, e2021WR030747.
12. Miltenberger A., Uhlemann., S., Mukerji., T., Williams, K.H., Dafflon, B., **Wainwright, H.M.**, (2021). A probabilistic framework for geoscientific hypothesis testing with geophysical data: application to electrical resistivity imaging of a fractured bedrock zone, *Solid Earth*, <https://doi.org/10.1029/2021JB021767>.
13. Lu, H., Ermakova, D., **Wainwright, H. M.**, Zheng, L., & Tartakovsky, D. M. (2021). Data-

- informed Emulators for Multi-Physics Simulations. *Journal of Machine Learning for Modeling and Computing*, 2(2).
14. **Wainwright, H.M.**, R. Oktem, B. Dafflon, S. Dengel, J.B. Curtis, M.S. Torn, J. Cherry, and S.S. Hubbard, “Multiscale Data Integration for Scaling Land-atmosphere Carbon Exchange in Ice-wedge Polygon Tundra”, *Land*, 10(7), 722; <https://doi.org/10.3390/land10070722>.
 15. Falco, N., **Wainwright, H. M.**, Dafflon, B., Ulrich, C., Soom, F., Peterson, J. E., ... & 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), 1-17.
 16. Ermakova, D., **Wainwright, H.M.**, Li, H., Zheng, L., “Global Sensitivity Analysis for Coupled Thermal-Hydrological-Chemical Simulations in Generic Nuclear Waste Repositories”, *Journal of Nuclear Engineering and Radiation Science*, 7(4), 041902.
 17. Yan, Q., **Wainwright, H.M.**, Dafflon, B., Uhlemann, S., Steefel, C. I., Falco, N., ... & Hubbard, S. S. (2021). Hybrid data-model-based mapping of soil thickness in a mountainous watershed. *Earth Surface Dynamics*, 9 (5), 1347-1361.
 18. Newcomer, M. E., Bouskill, N. J., **Wainwright, H.**, Maavara, T., Arora, B., Siirila-Woodburn, E. R., ... & 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), e2020GB006777.
 19. Carnevali, P. B. M., Lavy, A., Thomas, A. D., Crits-Christoph, A., Diamond, S., Meéheust, R., **H.M. Wainwright** & Falco, N. (2021). Meanders as a scaling motif for understanding of floodplain soil microbiome and biogeochemical potential at the watershed scale *Microbiome*, 9(1), 1-23.
 20. Meyal, A., Versteeg, R. J., Alper, E., Johnson, D., Rodzianko, A., Franklin, M., & **Wainwright, H.** (2020). Automated cloud based Long Short-Term Memory neural network based SWE prediction. *Frontiers in Water*, 2, 53.
 21. Hermes, A. L., **Wainwright, H. M.**, Wigmore, O. H., Falco, N., Molotch, N., & Hinckley, E. L. S. (2020). From patch to catchment: A statistical framework to identify and map soil moisture patterns across complex alpine terrain. *Frontiers in Water*, 2, 48.
 22. Devadoss, J., Falco, N., Dafflon, B., Wu, Y., Franklin, M., Hermes, A., ... & **Wainwright, H.** (2020). Remote Sensing-Informed Zonation for Understanding Snow, Plant and Soil Moisture Dynamics within a Mountain Ecosystem. *Remote Sensing*, 12(17), 2733.
 23. Chadwick, K. D., Brodrick, P. G., Grant, K., Goulden, T., Henderson, A., Falco, N., ... & Brodie, E. L. (2020). Integrating airborne remote sensing and field campaigns for ecology and Earth system science. *Methods in Ecology and Evolution*.
 24. Denham, M. E., Amidon, M. B., **Wainwright, H. M.**, Dafflon, B., Ajo-Franklin, J., & Eddy-Dilek, C. A. (2020). Improving Long-term Monitoring of Contaminated Groundwater at Sites where Attenuation-based Remedies are Deployed. *Environmental Management*, 1-20.
 25. **Wainwright, H. M.** et al., Satellite-derived foresummer drought sensitivity of plant productivity in Rocky Mountain headwater catchments: spatial heterogeneity and geological-geomorphological control, *Environmental Research Letters*, 2020, 15(8), 084018.
 26. Hubbard, S.S., C. Varadharajan, Y. Wu, **H. M. Wainwright**, and D. Dwivedi, Emerging Technologies and Radical Collaboration to Advance Predictive Understanding of Watershed Hydro-biogeochemistry, accepted in *Hydrological Processes*
 27. Sun, D., **Wainwright, H. M.**, Oroza, C. A., Seki, A., Mikami, S., Takemiya, H., & Saito, K., Optimizing long-term monitoring of radiation air-dose rates after the Fukushima Daiichi Nuclear Power Plant. *Journal of Environmental Radioactivity*, 220, 106281, 2020
 28. Hubbard, S.S., Williams, K.H., Agarwal, D., Banfield, J., Beller, H., Bouskill, N., Brodie,

- E., Carroll, R., Dafflon, B., Dwivedi, D., Falco, N., **Wainwright, H.M.**, “The East River, Colorado, Watershed: A mountainous community testbed for improving predictive understanding of multiscale hydrological–biogeochemical dynamics”, *Vadose Zone Journal*, 17(1), 2019.
29. Saito, K., Mikami, S., Andoh, M., Matsuda, N., Kinase, S., Tsuda, S., ... **Wainwright, H.M.** & Yoshimura, K. (2019). Temporal Change in Radiological Environments on Land after the Fukushima Daiichi Nuclear Power Plant Accident. *Journal of Radiation Protection and Research*, 44(4), 128-148.
 30. Saito, K., Mikami, S., Andoh, M., Matsuda, N., Kinase, S., Tsuda, S., Yoshida, T., Sato, T., Seki, A., Yamamoto, H., Sanada, Y., **Wainwright, H.M.**, “Summary of temporal changes in air dose rates and radionuclide deposition densities in the 80 km zone over five years after the Fukushima Nuclear Power Plant accident”. *Journal of environmental radioactivity*, <https://doi.org/10.1016/j.jenvrad.2018.12.020>, 2019.
 31. Arora, B., Dwivedi, D., Faybishenko, B., Jana, R. B., & Wainwright, H. M. (2019). Understanding and predicting vadose zone processes. *Reviews in Mineralogy and Geochemistry*, 85(1), 303-328.
 32. Buscheck, T. A., Mansoor, K., Yang, X., Wainwright, H. M., & Carroll, S. A. “Downhole pressure and chemical monitoring for CO₂ and brine leak detection in aquifers above a CO₂ storage reservoir”. *International Journal of Greenhouse Gas Control*, 91, 102812, 2019
 33. Libera, A., de Barros, F.P., Faybishenko, B., Eddy-Dilek, C., Denham, M., Lipnikov, K., Moulton, D., Maco, B. and **Wainwright, H.**, 2019. “Climate change impact on residual contaminants under sustainable remediation”. *Journal of contaminant hydrology*, 226, p.103518, 2019
 34. **Wainwright, H. M.**, Seki, A., Mikami, S., & Saito, K. (2019). Characterizing regional-scale temporal evolution of air dose rates after the Fukushima Daiichi Nuclear Power Plant accident. *Journal of environmental radioactivity*, 210, 105808.
 35. **Wainwright, H.**, Arora, B., Hubbard, S., Lipnikov, K., Moulton, D., Flach, G., ... & Denham, M., Sustainable Remediation in Complex Geologic Systems. *The Heaviest Metals: Science and Technology of the Actinides and Beyond*, 415, 2019.
 36. Maco, B., Bardos, P., Coulon, F., Erickson-Mulanax, E., Hansen, L.J., Harclerode, M., Hou, D., Mielbrecht, E., **Wainwright, H.M.**, Yasutaka, T. and Wick, W.D., “Resilient remediation: Addressing extreme weather and climate change, creating community value”. *Remediation Journal*, 29(1), pp.7-18., 2018.
 37. 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*”, 649, pp.284-299, 2019.
 38. Schmidt, F., **Wainwright, H.M.**, Faybishenko, M. Denham, C. Eddy-Dilek, “In-Situ Monitoring of Groundwater Contamination for Sustainable Remediation Using the Kalman Filter”, *Environmental Science and Technologies*, 52 (13), pp 7418–7425, 2018.
 39. Falco, N., Wainwright, H., Dafflon, B., Léger, E., Peterson, J., Steltzer, H., ... & Hubbard, S. S., Investigating Microtopographic and Soil Controls on a Mountainous Meadow Plant Community Using High-Resolution Remote Sensing and Surface Geophysical Data. *Journal of Geophysical Research: Biogeosciences*, 124(6), 1618-1636, 2019.
 40. Arora, B, J.A Davis, N. Spycher, **H.M. Wainwright**, “Comparison of Electrostatic and Non-electrostatic Models For U(VI) Sorption on Aquifer Sediments”, *Groundwater*, doi:10.1111/gwat.12551, 2017.
 41. Bisht, G., H.M. Wainwright et al., “Impacts of microtopographic snow-redistribution and lateral subsurface processes on hydrologic and thermal states in an Arctic polygonal ground

- ecosystem”, *Geosci. Model Dev.*, accepted.
42. Jeanne, P., J. Rutqvist, **H.M. Wainwright**, A.P. Rinaldi, W. Foxall, Q. Zhou, J. Birkholzer, “Effects of the distribution and evolution of the coefficient of friction along a fault on the assessment of the seismic activity associated with a hypothetical industrial-scale geologic CO₂ sequestration operation”, *International Journal of Greenhouse Gas Control*, <https://doi.org/10.1016/j.ijggc.2017.09.018>, 2017.
 43. **H.M. Wainwright**, M. Okumura and K. Saito, “A Multiscale Bayesian Data Integration Approach for Mapping Radionuclide Contamination”, Part II in “Resilience: A New Paradigm of Nuclear Safety”, Springer International Publishing, <https://doi.org/10.1007/978-3-319-58768-4>, 2017.
 44. Yabusaki, S.B., **H.M. Wainwright** et al., “Water Table Dynamics and Biogeochemical Cycling in a Shallow, Variably-Saturated Floodplain”, *Environmental Science & Technology*, DOI: 10.1021/acs.est.6b0487, 2017.
 45. **Wainwright, H.M.**, A. Liljedahl, J. Peterson, B. Dafflon, C. Ulrich, A. Gusmeroli, S. Hubbard, “Estimation of snow depth within a tundra ecosystem using multiscale observations and Bayesian methods”, *The Cryosphere*, 11(2), 857-875, 2017.
 46. **Wainwright, H.M.**, J. Chen, A. Seki and K. Saito, “A multiscale Bayesian data integration approach for mapping radionuclide contamination in the regional scale”, *Journal of Environmental Radioactivity*, 167, 62-69, 2017.
 47. Finsterle S., M. Commer, J.K. Edmiston, Y. Jung, M.B. Kowalsky, G.S.H. Pau, **H.M. Wainwright**, and Y. Zhang, “iTOUGH2: A Multiphysics Simulation-Optimization Framework for Analyzing Subsurface Systems”, *Computers & Geosciences*, <http://dx.doi.org/10.1016/j.cageo.2016.09.005>, 2016.
 48. Jeanne, P., J. Rutqvist, **H.M. Wainwright**, W. Foxall, C. Bachmann, Q. Zhou, A.P. Rinaldi, J. Birkholzer, “Impact of in-situ stress measurement uncertainties on the assessment of the seismic activity and risk associated with a hypothetical industrial-scale geologic CO₂ sequestration operation”, *Journal of Rock Mechanics and Geotechnical Engineering*, 10.1016/j.jrmge.2016.06.008, 2016.
 49. Dwivedi, D., B. Dafflon, B. Arora, **H.M. Wainwright** and S. Finsterle, “Spatial analysis and geostatistical methods”, in press, Chapter 21 in *Handbook of Applied Hydrology* (Editor: Singh, V.P.), McGraw-Hill, New York, USA, 2016.
 50. **Wainwright, H.M.**, A. Flores-Orozco, M. Bucker, B. Dafflon, S.S. Hubbard and K.H. Williams, “Probabilistic mapping of biogeochemical hotspots using induced polarization imaging”, *Water Resour. Res.*, 52, 533–551, doi:10.1002/2015WR017763, 2015.
 51. Dafflon B., Hubbard S.S., Ulrich, C., and Peterson J.E., Wu Y., **Wainwright H.**, and Kneafsey T., “Geophysical estimation of shallow permafrost distribution and properties in an ice-wedge polygon-dominated Arctic tundra region”, *Geophysics*, doi: 10.1190/geo2015-0175.1, 2015.
 52. Agarwal, D. A., Faybishenko, B., Freedman, V. L., Krishnan, H., Kushner, G., Lansing, C., Porter, E., Romosan, A., Shoshani, A., **Wainwright, H.**, Weidmer, A., and Wu, K. “A science data gateway for environmental management”. *Concurrency Computat.: Pract. Exper.*, doi: 10.1002/cpe.3697, 2015
 53. **Wainwright, H.M.**, B. Dafflon, L.J. Smith, M.S. Hahn, J.B. Curtis, Y. Wu, C. Ulrich, J.E. Peterson, M.S. Torn and S.S. Hubbard, “Identifying multiscale zonation and assessing the relative importance of polygon geomorphology on carbon fluxes in an Arctic Tundra Ecosystem”, *Journal of Geophysical Research, Biogeosciences*, doi: 10.1002/2014JG002799, 2015.
 54. Bromhal, G.S., J. Birkholzer, S.D. Mohaghegh, N. Sahinidis, **H.M. Wainwright**, Y. Zhang,

- S. Amini, V. Gholami, Y. Zhang and A. Shahkarami, "Evaluation of rapid performance reservoir models for quantitative risk assessment", *Energy Procedia*, 63, 3425-3431, ISSN 1876-6102, 2014.
55. **Wainwright, H.M.**, J. Chen, D. Sassen and S.S. Hubbard, "Bayesian Hierarchical Approach for Estimation of Reactive Facies over Plume-Scales Using Geophysical Datasets", *Water Resources Research*, 50, 4564–4584, doi:10.1002/2013WR013842, 2014.
56. Gangodagamage, C., J. Rowland, C. Wilson, S. Hubbard, S. Brumby, **H.M. Wainwright**, A. Liljedahl, G. Altmann, C. Tweedie, S. Wullschleger, "Predicting Active Layer Thickness Using Statistical Learning from Remotely Sensed High-Resolution Data in Arctic Permafrost Landscapes", *Water Resources Research*, 50, 6339–6357, doi:10.1002/2013WR014283, 2014.
57. Pau, G. SH, Y. Zhang, S.A. Finsterle, **H.M. Wainwright** and J.T. Birkholzer, "Reduced Order Modeling in iTOUGH2", *Computers & Geosciences*, <http://dx.doi.org/10.1016/j.cageo.2013.08.008>, 2013.
58. **Wainwright, H.M.**, S. Finsterle, Y. Jung, Q. Zhou and J.T. Birkholzer, "Making Sense of Global Sensitivity Analysis", *Computers & Geosciences*, ISSN 0098-3004, <http://dx.doi.org/10.1016/j.cageo.2013.06.006>, 2013.
59. **Wainwright, H.M.**, S. Finsterle, Q. Zhou, J.T. Birkholzer, "Modeling the Performance of Large-Scale CO₂ Storage Systems: A Comparison of Different Sensitivity Analysis Methods", *International Journal of Greenhouse Gas Control*, 17, Pages 189-205, ISSN 1750-5836, <http://dx.doi.org/10.1016/j.ijggc.2013.05.007>, 2013.
60. Bea, B. A., **H.M. Wainwright**, N. Spycher, B. Faybishenko, S. S. Hubbard, M. Denham, "Identifying key controls on acidic-U(VI) plume behavior at the Savannah River Site, using reactive transport modeling", *Journal of Contaminant Hydrology*, 151, 34-54, ISSN 0169-7722, <http://dx.doi.org/10.1016/j.jconhyd.2013.04.005>, 2013.
61. Hubbard, S. S., C. Gangodagamage, B. Dafflon, **H.M. Wainwright**, J. E. Peterson, A. Gusmeroli, C. Ulrich, Y. Wu, C. Wilson, J. Rowland, C. Tweedie and S.D. Wullschleger, "Quantifying and relating land-surface and subsurface variability in permafrost environments using LiDAR and surface geophysical datasets", *Hydrogeology*, Feb2013.doi: 10.1007/s10040-012-0939-y, 2013.
62. Chen, X., **H. Murakami**, M.S. Hahn, G. Hammond, M.L. Rockhold and Y. Rubin, "Bayesian geostatistical aquifer characterization at the Hanford 300 Area using tracer test data", *Water Resour. Res.*, 48, W06501, doi:10.1029/2011WR010675, 2012.
63. **Murakami, H.**, X. Chen, M.S. Hahn, Y. Liu, M.L. Rockhold, V.R. Vermeul, J.M. Zachara, and Y. Rubin, "Bayesian approach for three-dimensional aquifer characterization at the Hanford 300 area", *Hydrol. Earth Syst. Sci.* 7, 2017–2052, 2010.
64. Rubin, Y., X. Chen, **H. Murakami**, M. Hahn, "A Bayesian approach for inverse modeling, data assimilation and conditional simulation of spatial random fields", *Water Resour. Res.*, 46, W10523, doi:10.1029/2009WR008799, 2010.
65. **Murakami, H.**, J. Ahn, "Development of compartment models with Markov-chain processes for radionuclide transport in repository region", *Annals of Nuclear Energy*, 38 (2-3), 511-519, 2010, doi: 10.1016/j.anucene.2010.09.013, 2010.
66. I. Kanno, S. Hishiki, **H. Murakami**, O. Sugiura, Y. Murase, T. Nakamura, M. Katagiri, "Schottky and pn Junction Cryogenic Radiation Detectors Made of p-InSb Compound Semiconductor", *Nucl.Inst.Meth.A* **520**, page 93-95, 2004.

OTHER PUBLICATIONS

- **Wainwright, H.M.** and Eddy-Dilek, C., Advanced Long-term Monitoring Systems (ALTEMIS) Project: Establishing the New Paradigm of groundwater monitoring, Proceeding of WM2022 Conference, March 9-11, 2022, Phoenix, Arizona, USA (2022).
- Xu et al., Reactive Transport Modeling for Supporting Climate Resilience, Proceeding of WM2021 Conference, March 9-11, 2021, Phoenix, Arizona, USA (2021).
- **Wainwright, H.M.**, Annual report: “JAEA-LBNL Collaboration on Modeling, Monitoring and Data Integration Support for Environmental Restoration of the Fukushima Area”, March 30th, 2021.
- Zouabe, J., Zavarin, M., Wainwright, H.M., Machine Learning in Environmental Chemistry: Application to Surface Complexation Modeling, doi.org/10.2172/1669226.
- **Wainwright, H.M.**, “Report: LBNL FY20 research in GDSA Modeling and Integration”, August 21st, LBNL report.
- Wainwright, H.M., “Machine learning for soil and groundwater contamination”, Proceeding of WM2020 Conference, March 9-11, 2020, Phoenix, Arizona, USA (2020).
- Libera, A., de Barros, F., Faybishenko, B., Eddy-Dilek, C., Denham, M., Lipnikov, K., Maco, B., **Wainwright, H.** “Hydrological Controls on Residual Contaminants Under Sustainable Remediation”, Proceeding of WM2019 Conference, March 5-8, 2019, Phoenix, Arizona, USA (2019).
- **Wainwright HM**, Sun D., Oroza C., Seki A, Mikami S, Saito K, “Optimizing Long-term Monitoring of Radiation Air Dose Rates”, Proceeding of WM2019 Conference, March 5-8, 2019, Phoenix, Arizona, USA (2019).
- **Wainwright HM**, Seki A, Mikami S, Saito K, Integrating Multiscale Datasets for Monitoring Temporal Changes of Air Dose Rates in Fukushima, Proceeding of WM2018 Conference, March 18-21, 2018, Poenix, Arisona, USA (2018).
- Schmidt. F., **Wainwright, H.M**, Faybishenko, M. Denham, C. Eddy-Dilek “In-Situ Monitoring of Groundwater Contamination for Sustainable Remediation Using the Kalman Filter”, Proceeding of WM2018 Conference, March 18-21, 2018, Poenix, Arisona, USA (2018).
- **Wainwright, H.M**, F. Schmidt, A. Libera, B. Faybishenko, M. Denham, F. de Barros, K. Lipnikov, D. Moulton, B. Maco, C. Eddy-Dilek “Technical Innovations for Sustainable Remediation: In situ Groundwater Monitoring and Climate Resiliency”, Proceeding of WM2018 Conference, March 18-21, 2018, Poenix, Arisona, USA (2018).
- **Wainwright HM**, Seki A, Chen J, Saito K: A multiscale Bayesian data integration approach for mapping air dose rates around the Fukushima Daiichi Nuclear Power Plant. Proceeding of WM2017 Conference, March 5-9, 2017, Poenix, Arisona, USA (2017).
- **Wainwright, H.M.**, B. Faybishenko, S. Molins, J.A. Davis, B. Arora, G. Pau, J. Johnson, G. Flach, M. Denham and C. Eddy-Dilek, J.D. Moulton, K. Lipnikov, C. Gable, T. Miller and M. Freshley, “Coupling Big Data Analytics and Reactive Transport Modeling for Cost-effective Groundwater Monitoring”, Proceeding of WM2017 Conference, March 5 – 9, 2017, Phoenix, Arizona, USA.
- **Wainwright, H.M.**, C. Varadharajan, A. Haefner, B. Faybishenko, Agarwal, K. Vetter, J. Birkholzer, Midterm report: “JAEA-LBNL Collaboration on Modeling, Monitoring and Data Integration Support for Environmental Restoration of the Fukushima Area”, March 30th, 2017.
- **Wainwright, H.M.**, S. Molins, J.A. Davis, B. Arora, B. Faybishenko, H. Krishnan, S. Hubbard, G.

Flach, M. Denham and C. Eddy-Dilek, J.D. Moulton, K. Lipnikov, C. Gable, T. Miller and M. Freshley, “Using ASCEM Modeling and Visualization to Optimize Remediation Strategies at F-Area Savannah River Site, SC”, MODFLOW and More Conference, May 30 – June 3, 2015, Golden, Colorado, USA.

- **Wainwright, H.M.**, M. Okumura and K. Saito, “A Multiscale Bayesian Data Integration Approach for Mapping Radionuclide Contamination”, International Workshop on Nuclear Safety: From accident mitigation to resilient society facing extreme situations, March 23-24, 2015, Berkeley, California, USA.

- **Wainwright, H.M.**, S. Molins, J.A. Davis, B. Arora, B. Faybishenko, H. Krishnan, S. Hubbard, G. Flach, M. Denham and C. Eddy-Dilek, J.D. Moulton, K. Lipnikov, C. Gable, T. Miller and M. Freshley, “Using ASCEM Modeling and Visualization to Inform Stakeholders of Contaminant Plume Evolution and Remediation Efficacy at F-Basin Savannah River, SC”, Proceedings of WM2015 Conference, March 15 – 19, 2015, Phoenix, Arizona, USA.

- Quinn, N., **H. M. Wainwright**, P. Jordan, Q. Zhou, J. Birkholzer, “Potential Impacts of Future Geological Storage of CO₂ on the Groundwater Resources in California’s Central Valley Simulations of Deep Basin Pressure Changes and Effect on Shallow Water Resources”, California Energy Commission. Publication number: CEC-500-2014-028.

- Houseworth, J., **H.M. Wainwright**, J. Birkholzer, “Assessment of Decoupling Wellbore Leakage from Reservoir Flow in Reduced-Order Models”, NRAP-TRS-III-001-2013, NRAP Technical Report Series, U.S. Department of Energy, National Energy Technology Laboratory: Morgantown, WV, 2013.

- **Wainwright, H.M.**, S. Finsterle, Q. Zhou, J.T. Birkholzer, “Improved Understanding of Global Sensitivity Analysis: Applications to CO₂ Storage Systems”, Proceedings of Modflow and More Conference, Golden, Colorado, 2013.

- Freshley, M., Hubbard, S., **H.M. Wainwright** et al., “Advanced Simulation Capability for Environmental Management (ASCEM) Phase II Demonstration”, ASCEM-SITE-2012-01, 2012.

- **Wainwright, H.M.**, S. Finsterle, Q. Zhou, and J. Birkholzer, “Modeling the Performance of Large-Scale CO₂ Storage Systems: A Comparison of Different Sensitivity Analysis Methods”, NRAP-TRS-III-002-2012, NRAP Technical Report Series, U.S. Department of Energy, National Energy Technology Laboratory: Morgantown, WV, 2012.

- **Wainwright, H.M.**, S. Finsterle, Q. Zhou, Y. Jung and J. Birkholzer, “iTOUGH2 Global Sensitivity Analysis Module: Applications to CO₂ Storage Systems”, Proceedings of TOUGH Symposium 2012, Lawrence Berkeley National Laboratory, Berkeley, California, September 2012.

- **Wainwright, H.M.**, Hubbard, S.S., Dafflon, B., Ulrich, C., Wu, Y., Gangodagamage, C., Rowland, J., Wilson, C., Tweedie, C., Wullschleger, S.D., “Multiscale Bayesian fusion approach using geophysical and remote sensing data for characterizing arctic tundra hydrogeochemical properties”, Proceedings of Tenth International Conference on Permafrost, Salekhard, Russia, 2012.

- **Murakami, H.** and J. Ahn, “Development of Compartment Models for Radionuclide Transport in Repository Region”, Proceedings of the 12th International High-Level Radioactive Waste Management Conference, Las Vegas, Nevada, 2008.

- J. Li, **H. Murakami**, Y. Liu, P.E.A. Gomez, M. Gudipati, and M. Greiner, “Peak Cladding Temperature in a Spent Fuel Storage or Transportation Cask”, Proceedings of the 15th International Symposium on the Packaging and Transportation of Radioactive Materials, PATRAM 2007.

SOFTWARE

- Bayesian Integration of multiscale environmental data, <https://www.osti.gov/biblio/1314948>
- Plant density and enhanced plant vigor estimation algorithms for high-resolution images 2019-179
[https://ipo.lbl.gov/plant-density-and-enhanced-plant-vigor-estimation-algorithms-for-high-resolution-ima
ges-2019-179/](https://ipo.lbl.gov/plant-density-and-enhanced-plant-vigor-estimation-algorithms-for-high-resolution-imag-2019-179/)

INVITED TALKS AND LECTURES

59 invited talks

1. **Wainwright, H.M.**, “New paradigm of monitoring soil and groundwater contamination under changing climate”, Seminar at Argonne National Laboratory, April 7th, 2022
2. **Wainwright, H.M.**, “Advanced Long-term Environmental Monitoring Systems (ALTEMIS)”, Waste Management Symposium, 005 Roundtable: Risk-Based Approaches to Environmental Remediation and Adaptive Site Management (invited as a panel member), March 7-11th, 2022
3. **Wainwright, H.M.**, “Climate Resilience Assessments at the DOE Legacy Management Sites”, Waste Management Symposium, 064 Panel: DOE Network of National Laboratories for Environmental Management and Stewardship (invited as a panel member), March 7-11th, 2022
4. **Wainwright, H.M.**, “Advanced Long-term Environmental Monitoring Systems (ALTEMIS) for Sustainable Remediation”, American Geophysical Union Meeting, H44C: Advances in Subsurface Monitoring, Characterization, and Remediation of Contaminated Sites I Oral (invited talk), December 16th, 2021
5. **Wainwright, H.M.**, “Advanced Long-term Environmental Monitoring Systems (ALTEMIS): New paradigm of long-term monitoring”, EPA’s Groundwater Forum, November 4th, 2021
6. **Wainwright, H.M.**, “Digital Twin for Watersheds: Improving Watershed Systems Predictability Through Co-Design”, San Jose State University, Departmental Seminar, October 15th, 2021.
7. **Wainwright, H.M.**, “AI for Earth System Predictability”, Plenary Talk, The Department of Energy's Environmental System Science (ESS) Program Principal Investigator Meeting, August 19th, 2021.
8. **Wainwright, H.M.**, “Advanced Long-term Environmental Systems (ALTEMIS): Establishing New Paradigm of Environmental Monitoring”, Florida International University Departmental Seminar, July 20th, 2021.
9. **Wainwright, H.M.**, “ML for Watershed Science”, LBNL 90th Anniversary Lecture Series, June 25th, 2021.
10. **Wainwright, H.M.**, “Data Integration of Environmental Datasets”, Guest lecture in ESPM171a: Environmental Geophysics for Critical Zone, UC-Berkeley, April 24th, 2021.
11. **Wainwright, H.M.** et al., "Environmental Resilience in Nuclear Energy", MIT Seminar, April 15th, 2021.
12. **Wainwright, H.M.** et al., “UQ and Emulators for Coupling THC and PA”, Spent Fuel and Waste Disposition Telecommuting Seminar Series, April 14th, 2021.
13. **Wainwright, H.M.**, “Geostatistics on Complex Environmental Datasets”, Guest lecture in ESPM171a: Environmental Geophysics for Critical Zone, UC-Berkeley, April 10th, 2021.

14. **Wainwright, H.M.** et al., “Open-source Machine Learning Framework for Long-term Monitoring of Environmental Contamination”, International Symposium on Water Sustainability: Challenges, Technologies & Opportunities (IWSS), Amrita Vishwa Vidyapeetham University, Online, Mar. 22-25.
15. **Wainwright, H.M.** et al., “Watershed Co-Design: Data-Model Integration for Capturing Watershed Heterogeneity”, Computational Methods for Water Resources, December 17th, 2020 (plenary)
16. **Wainwright, H.M.** et al, “Importance of long-term radiation monitoring at nuclear contaminated sites”, Biosphere Research Institute Symposium on Environmental Restoration after the Fukushima Nuclear Power Plant Accident, November 30th, 2020 (plenary).
17. **Wainwright, H.M.** et al., “Team Science in Earth Sciences and beyond”, Japan Society for the Promotion of Science, San Francisco meeting, September 18th, 2020.
18. **Wainwright, H.M.** et al, “Innovative sensors and data assimilation for monitoring subsurface processes”, Gordon Research Conference, July 19th, 2020 (plenary).
19. **Wainwright, H.M.** et al, “Bioremediation for Inorganic Contaminants and Role of in situ Monitoring Strategies”, Federal Remediation Round Table Webinar, June 5th, 2020.
20. **Wainwright, H.M.** et al, “Machine Learning in Environmental Systems – from Nuclear Waste to Ecosystem Science”, 2020 National Science Bowl® (NSB) Science Day, Washington DC, May 1st, 2020. (keynote speaker)
21. **Wainwright, H.M.** et al, “Coupled Above and Below-ground Characterization and Monitoring for Ecosystem and Contamination Research”, ENIGMA conference, Copenhagen, April 14th-16th 2020. (keynote)
22. **Wainwright, H.M.** et al, “Environmental Perspectives of Nuclear Energy: Fukushima Nuclear Power Plant Accident and Radioactive Waste Disposal”, University of California at Berkeley, Nuclear Engineering Department, Guest Lectures NE 25, April 06th and 28th, 2020.
23. **Wainwright, H.M.** et al, “What Sounds Scary vs What Actually Matters: Risk Perspectives for Nuclear Waste and Contamination (and Possibly Coronavirus)”, University of California at Berkeley, Nuclear Engineering Department, Colloquium Series, April 15th, 2020.
24. **Wainwright, H.M.** et al, “Environmental Nuclear Waste: Insights from US Weapon Sites”, Symposium for Environmental Management of Nuclear Emergency and Radioactive Waste Disposal, Tsukuba University, March 9th, 2020 (keynote).
25. **Wainwright, H.M.** et al, “New Roles of Groundwater Flow and Reactive Transport Modeling in Environmental Remediation and Waste Isolation”, Stanford University, Energy Resources Engineering, Seminar Series, February 25th, 2020.
26. **Wainwright, H.M.** et al, “Watershed Functional Zonation for Quantifying Watershed Organization and Functions Based on High-resolution Airborne Remote Sensing Data”, University of Colorado, Boulder, Niwot LTER Seminar, January 15th, 2020.
27. **Wainwright, H.M.** et al, “Microtopographic Controls on Ecosystem Functioning: High-resolution Mapping and Spatial Aggregation”, University of Colorado, Boulder, Institute of Alpine and Arctic Research (INSTAAR) seminar series, January 11th, 2020.
28. **Wainwright, H.M.** et al, “New paradigm in environmental monitoring and characterization through in situ sensors, remote sensing and machine learning”, Lawrence Livermore National Laboratory SFA Seminar, December 4th, 2019.
29. **Wainwright, H.M.** et al, “Optimize Monitoring Strategies using Reactive Transport Modeling”, Federal Remediation Round Table, November 26th, 2019.
30. **Wainwright, H.M.** et al, “Challenge of Machine Learning in the Environmental Applications”, EPRI Workshop, October 16th, 2019.
31. **Wainwright, H.M.** et al, “Innovative Monitoring Strategies for Surface and Groundwater

- Contamination”, Stanford SLAC seminar, July 2nd, 2019.
32. **Wainwright, H.M.** et al, “Multiscale Data Integration for Radiation Monitoring”, TERRITORIES Workshop, Madrid, Spain, June 14th, 2018.
 33. **Wainwright, H.M.** et al, “Sustainable remediation and environmental monitoring at nuclear contaminated sites”, Seminar, IRSN, Paris, France, June 12th, 2018.
 34. **Wainwright, H.M.** et al, “End-State driven Sustainable Remediation”, 3rd IAEA MODARIA II Meeting, Ljubljana, Slovenia, May 6th, 2018.
 35. **Wainwright, H.M.** et al, “Sustainable remediation and environmental monitoring at nuclear contaminated sites”, Departmental Seminar, Tokyo University, Tokyo, Japan, April 14th, 2018.
 36. **Wainwright, H.M.** et al, “Multiscale Data Integration for Environmental Monitoring”, Departmental Seminar, Clemson University, Clemson, SC, February 1st, 2018.
 37. **Wainwright, H.M.** et al, “Define End-State and Optimize Monitoring Program under Sustainable Remediation”, 2nd IAEA MODARIA II Meeting, Vienna, Nov 3rd, 2017.
 38. **Wainwright, H.M.**, “Define End-State and Optimize Monitoring Program under Sustainable Remediation”, 2nd IAEA MODARIA II Meeting, Vienna, Nov 3rd, 2017.
 39. **Wainwright, H.M.**, “Define End-State and Optimize Monitoring Program Using High-Performance Computing Codes”, Interagency Steering Committee on Performance and Risk Assessment Community of Practice (P&RA CoP) Annual Technical Exchange Meeting, Albuquerque, New Mexico, October 19th, 2017.
 40. **Wainwright, H.M.**, “How can high-performance computing support sustainable remediation?”, Departmental seminar, JAEA Center for Computation and e-System, Tokyo, Japan, October 12rd, 2017.
 41. **Wainwright, H.M.**, “Define End-State and Optimize Monitoring Program Using High-Performance Computing Codes”, IAEA MODARIA II Meeting, Brussels, June 27th, 2017.
 42. **Wainwright, H.M.**, “Model and Data Integration for Long-term Monitoring in Sustainable Groundwater Remediation”, Seminar, Neptune and Company Inc, May 25th, Denver Colorado, 2017.
 43. **Wainwright, H.M.**, “Technical Advances for Environmental Resiliency after the Fukushima Nuclear Power Plant accident”, Environmental Seminar, Fukushima University, Fukushima, Japan, April 14th, 2017.
 44. **Wainwright, H.M.**, “Multiscale Data Integration for Environmental Monitoring”, Environmental Engineering seminar, Department of Civil and Environmental Engineering, University of California, Berkeley, February 24th, 2017.
 45. **Wainwright, H.M.**, “Multiscale Data Integration for Environmental Monitoring”, Geolunch seminar, Geospatial Innovation Facility, University of California, Berkeley, February 9th, 2017.
 46. **Wainwright, H.M.**, “Environmental Resiliency through Advanced Monitoring Technologies”, Environmental Seminar, Research Institute for Geo-Resources and Environment, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan, February 16th, 2017.
 47. **Wainwright, H.M.**, “Multiscale Data Integration for Environmental Monitoring”, the 29th JAEA Center for Computation and e-System Workshop on Fukushima Environmental Restoration, Tokyo, Japan, February 13th, 2017.
 48. Eddy-Dilek, C. and **H.M. Wainwright**, "Application of ASCEM to SRS F Area Seepage Study”, Interagency Steering Committee on Performance and Risk Assessment Community of Practice (P&RA CoP) Annual Technical Exchange Meeting, Washington DC, October 19th, 2016.
 49. **Wainwright, H.M.**, "Technical Advances in Groundwater Monitoring”, Sustainable

- Remediation Forum 33, Washington DC, October 19th, 2016.
50. **Wainwright, H.M.**, “A multiscale Bayesian data integration approach for mapping radionuclide contamination in the regional scale”, Colorado State University, Fort Collins, October 8th, 2016.
 51. **Wainwright, H.M.** and K.H. Williams, “Scientific and Technical Advances for Sustainable Remediation at Former Nuclear Weapon Production and Uranium Mill Tailing Sites”, Central Rocky Mountain Health Physics Chapter Meeting, Denver, October 7th, 2016.
 52. **Wainwright, H.M.**, "Environmental Resiliency on Nuclear Energy", Department of Nuclear Engineering, Colloquium Series, University of California, Berkeley, September 26th, 2016.
 53. **Wainwright, H.M.**, B. Faybishenko, S. Molins, G. Pau, J. Johnson, G. Flach, M. Denham, J.D. Moulton, K. Lipnikov, C. Gable, T. Miller and C. Eddy-Dilek, “Technical Innovations for Cost-effective Groundwater Monitoring of Tritium Plume”, 2016 EPRI Groundwater Protection Workshop, Pittsburg, PA, July 12-14th, 2016.
 54. **Wainwright, H.M.**, "Data Integration of Complex Environmental Datasets for Radionuclide Contamination: Case studies in Fukushima Prefecture and Former Nuclear Weapon Production Sites in US", Symposium on the Future of Nuclear Energy and Fuel Cycle, University of Tokyo, Tokyo, June 25th, 2016.
 55. **Wainwright, H.M.**, B. Dafflon, and S.S. Hubbard, "Coupled geophysical and remote sensing techniques for quantifying ecosystem functioning across scales", Geophysics Seminar, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, November 6th, 2015.
 56. **Wainwright, H.M.**, M. Okumura and K. Saito, “Integration of Complex Environmental Datasets for Characterizing Radionuclide Contamination”, International Workshop on Nuclear Safety: From accident mitigation to resilient society facing extreme situations, Berkeley, USA, March 23-24, 2015.
 57. **Wainwright, H.M.**, “Geostatistics on Complex Environmental Datasets”, in NE290: Special Topics in Environmental Aspects of Nuclear Engineering, UC-Berkeley, October 2014 and 2015
 58. **Wainwright, H.M.**, Davis, J., Spycher, N., Hubbard, S.S., “Reactive Fate and Transport Modeling Experiences, Including Geochemical Behavior of Cesium in the Subsurface”, U.S.-Japan Workshop for Decommissioning and Environmental Management, Tokyo, Japan, July 17-18, 2013.
 59. **Wainwright, H.M.**, “Basic Knowledge for Understanding Radionuclide Contamination from the Fukushima Nuclear Power Plant Accident (in Japanese)”, Special seminar at Japanese Graduates and Researchers Society at Berkeley, Berkeley, CA, April 23, 2011.

CONFERENCE PRESENTATIONS

- **Wainwright, H.M.**, “Advanced Long-term Environmental Monitoring Systems (ALTEMIS) for Sustainable Remediation”, Waste Management Symposium, March 7-11th, 2022
- **Wainwright, H.M.**, et al., Watershed Monitoring Network Optimization Through Co-Design: Bedrock-to-Canopy Characterization and Ecohydrological Modeling, 2021 AGU Fall Meeting, New Orleans, LA, 12-17. Dec. 2021.
- **Wainwright, H.M.**, et al., “Spatiotemporal Heterogeneity of Radiation Environmental Decay after the Fukushima Daiichi Nuclear Power Plant Accident, Atomic Energy Society Meeting of Japan Annual Meeting, September 8th, 2021.
- **Wainwright, H.M.**, et al., “Watershed Functional Zonation: Linking Watershed Patterns,

Processes and Functions through Advanced Characterization Technologies”, American Geophysical Union Fall Meeting, December 9th, 2020.

- **Wainwright, H.M.**, et al., “Watershed Functional Zone; Multi-type multi-scale integration for understanding watershed functioning”, Interagency Conference on Research in the Watersheds, November 17th, 2020.

- **Wainwright, H.M.**, et al., “Spatiotemporal Data Integration of Long-term Radiation Monitoring after the Fukushima Daiichi Nuclear Power Plant Accident, Atomic Energy Society Meeting of Japan Annual Meeting, September 16, 2020.

- **Wainwright, H.M.** et al., “Machine learning for soil and groundwater contamination”, Waste Management 2020 Conference, Phoenix, March 11th, 2020

- **Wainwright, H.M.** et al., "Toward watershed characterization: investigation of above-belowground interactions with hyperspectral remote sensing and near-surface geophysical measurements within the Upper Colorado Basin", 2019 AGU Fall Meeting, San Francisco, CA. 9-13. Dec.

- **Wainwright, H.M.** et al., “Regional-scale temporal evolution of air dose rates after the Fukushima Daiichi nuclear power plant accident and long-term monitoring optimizations”, Atomic Energy Society Meeting of Japan, Toyama, Japan, September 13-15, 2019.

- **Wainwright, H.M.** et al., “Reactive transport modelling for supporting long-term monitoring after environmental remediation at radioactively contaminated sites”, Migration 2019, Kyoto, Japan, September 18th, 2019.

- **Wainwright, H.M. et al.**, "Climate change impacts on residual contaminants under sustainable remediation", 33rd Annual International Conference on Soils, Sediments, Water, and Energy, October 16-19, 2017, Amherst, Massachusetts.

- **Wainwright et al.**, "Regional-scale changes in radiation air dose rate around the Fukushima Nuclear Power Plant", Atomic Energy Society Meeting of Japan, September 13-15, 2017, Sapporo, Japan.

- **Wainwright et al.**, “Recent technologies for Environmental Resiliency in Nuclear Energy”, American Nuclear Society Meeting, June 11-16, 2017, Francisco, California, USA.

- **Wainwright et al.**, “Coupling Big Data Analytics and Reactive Transport Modeling for Cost-effective Groundwater Monitoring”, MODFLOW and MORE Conference, May 22-25, 2017, Golden, Colorado, USA.

- **Wainwright et al.**, “Digital Watershed; Characterizing the above and belowground variability in a Mountainous Watershed”, the 2017 DOE TES/SBR PI meeting, April 25-26, Washington DC, USA

- Schmidt F., **H.M. Wainwright**, B. Faybishenko. C. Eddy-Dilek, M. Denham “In Situ Monitoring of Groundwater Contamination Using the Kalman Filter”, Waste Management 2017 Conference, Phoenix, March 9th, 2017

- **Wainwright, H.M.**, B. Faybishenko, S. Molins, J.A. Davis, B. Arora, G. Pau, J. Johnson, G. Flach, M. Denham and C. Eddy-Dilek, J.D. Moulton, K. Lipnikov, C. Gable, T. Miller and M. Freshley, “Coupling Big Data Analytics and Reactive Transport Modeling for Cost-effective Groundwater Monitoring”, Waste Management 2017, March 5 – 9, 2017, Phoenix, Arizona, USA.

- **Wainwright HM**, Seki A, Chen J, Saito K: A multiscale Bayesian data integration approach for mapping air dose rates around the Fukushima Daiichi Nuclear Power Plant. Waste Management 2017 Conference, March 5-9, 2017, Poenix, Arisona, USA (2017).

- Hubbard, S.S., **H.M. Wainwright** et al., “Predicting Mountainous Watershed Biogeochemical Dynamics, Including Response to Droughts and Early Snowmelt”, H13L-1582 , AGU Fall Meeting 2016.
- **Wainwright HM** et al., “Mapping Drought Sensitivity of Ecosystem Functioning in Mountainous Watersheds: Spatial Heterogeneity and Geological-Geomorphological Control”, H11D-06, AGU Fall Meeting 2016.
- Riley W.J., **H.M. Wainwright** et al., “Early and late season warming affects nitrogen dynamics in a polygonal tundra landscape: Analyses using ecosys and NGEA-Arctic observations in Barrow, Alaska”, B43C-0625, AGU Fall Meeting 2016.
- Oktem, R., **H.M. Wainwright** et al., “Ground-based Remote Sensing for Quantifying Subsurface and Surface Co-variability to Scale Arctic Ecosystem Functioning”, B33C-0617, AGU Fall Meeting 2016.
- Jeanne, P., **H.M. Wainwright** et al., “Assessment of the predicted seismic activity associated with a hypothetical industrial-scale geologic CO₂ sequestration operation: effect of in-situ stress measurement uncertainties and friction law”, S31B-2752, AGU Fall Meeting, 2016.
- Heikoop, J., **H.M. Wainwright** et al. ” The Nitrate Inventory of Unsaturated Soils at the Barrow Environmental Observatory: Current Conditions and Potential Future Trajectories”, B33B-0587, AGU Fall Meeting 2016.
- **Wainwright HM**, Seki A, Chen J, Saito K, “A multiscale Bayesian data integration approach for mapping air dose rates in the evacuation zone around the Fukushima Daiichi Nuclear Power Plant”, Japan Atomic Energy Agency Meeting, September 6-10th, Kurume, Japan.
- **Wainwright, H.M.**, B. Dafflon, L.J. Smith, M.S. Hahn, J.B. Curtis, Y. Wu, C. Ulrich, J.E. Peterson, M.S. Torn and S.S. Hubbard, “Ecosystem Functional Zonation Approach to Integrate Multi-type Multiscale Datasets for Scaling Above and Below-ground Control on Carbon Cycling”, International Conference on Permafrost, Potsdam, Germany, June 2016.
- **Wainwright, H.M.**, S. Molins, J.A. Davis, B. Arora, B. Faybishenko, H. Krishnan, S. Hubbard, G. Flach, M. Denham and C. Eddy-Dilek, J.D. Moulton, K. Lipnikov, C. Gable, T. Miller and M. Freshley, “Effective Long-term Monitoring Strategies by Integrating Reactive Transport Models with In situ Geochemical Measurements”, WM2016 Conference, Phoenix, USA, March 2016.
- **Wainwright, H.M.**, A. Liljedahl, J. Peterson, B. Dafflon, C. Ulrich, A. Gusmeroli, S. Hubbard, “Multiscale Observational Platforms and Bayesian Data Integration to Estimate Snow Depth and Snow-water-equivalent over the Ice-wedge Polygonal Tundra”, AGU Fall Meeting 2015, San Francisco, December 2015.
- **Wainwright, H.M.**, A. Flores-Orozco, M. Bucker, B. Dafflon, S.S. Hubbard and K.H. Williams, “Noninvasive Characterization of Biogeochemical Hotspots Using Induced Polarization Imaging”, Goldschmidt, Prague, August 2015.
- **Wainwright, H.M.**, S. Molins, J.A. Davis, B. Arora, B. Faybishenko, H. Krishnan, S. Hubbard, G. Flach, M. Denham and C. Eddy-Dilek, J.D. Moulton, K. Lipnikov, C. Gable, T. Miller and M. Freshley, “Using ASCEM Modeling and Visualization to Optimize Remediation Strategies at F-Area Savannah River Site, SC”, MODFLOW and MORE Conference, Golden, USA, June 2015.
- **Wainwright, H.M.**, S. Molins, J.A. Davis, B. Arora, B. Faybishenko, H. Krishnan, S. Hubbard, G. Flach, M. Denham and C. Eddy-Dilek, J.D. Moulton, K. Lipnikov, C. Gable, T. Miller and M. Freshley, “Using ASCEM Modeling and Visualization to Inform Stakeholders of Contaminant

Plume Evolution and Remediation Efficacy at F-Basin Savannah River, SC”, WM2015 Conference, Phoenix, USA, March 2015.

- **Wainwright, H.M.**, B. Dafflon, L.J. Smith, M.S. Hahn, J.B. Curtis, Y. Wu, C. Ulrich, J.E. Peterson, M.S. Torn and S.S. Hubbard, “Identifying multiscale zonation and assessing the relative importance of polygon geomorphology on carbon fluxes in an Arctic Tundra Ecosystem”, B54F-07, AGU Fall meeting, San Francisco, USA, December 2014.
- **Wainwright, H.M.**, A. Flores-Orozco, M. Bücken, B. Dafflon and K.H. Williams, “Reactive transport modeling parameterization using geophysical datasets”, Complex Soil Systems Conference, Berkeley, USA, September 2014.
- **Wainwright, H.M.**, S. Molins, J.A. Davis, B. Arora, B. Faybishenko, H. Krishnan, S. Hubbard, G. Flach, M. Denham and C. Eddy-Dilek, J.D. Moulton, K. Lipnikov, C. Gable, T. Miller and M. Freshley, “Optimizing monitoring and remediation strategies at the Savannah River Site F- Area, using the Advanced Simulation Capability for Environmental Management (ASCEM)”, Complex Soil Systems Conference, Berkeley, USA, September 2014.
- **Wainwright, H.M.**, Y. Zhang, S.A. Finsterle, J.T. Birkholzer, “Uncertainty quantification in CO₂ storage systems; impacts of different CO₂ storage scenarios”, XX. International Conference on Computational Methods in Water Resources, Stuttgart, Germany, June 2014.
- **Wainwright, H.M.**, S.S. Hubbard, B. Dafflon, C. Ulrich, J.E. Peterson, Y. Wu, M.S. Hahn, M.S. Torn, C. Gangodagamage, J.C. Rowland, C.J. Wilson, A. Liljedahl, A. Gusmeroli, S.D. Wullschleger, “Characterizing subsurface controls on the Arctic ecosystem carbon cycling across scales using geophysical, in-situ and remote sensing datasets”, C53C-06, AGU Fall meeting, San Francisco, USA, December 2013.
- Hubbard, S.S. B., Dafflon, **H.M. Wainwright**, T.K. Tokunaga, C. Ulrich, J. Jansson, M. Torn, K.H. Williams, “Characterizing Controls on Terrestrial Environment Functioning Across Scales using Geophysical Datasets (Invited)”, H41L-04, AGU Fall meeting, San Francisco, USA, December 2013.
- **Wainwright, H.M.**, S. Finsterle, Q. Zhou, J.T. Birkholzer, “Improved Understanding of Global Sensitivity Analysis: Applications to CO₂ Storage Systems”, MODFLOW and More conference 2013, Golden, USA D, June 2013.
- **Wainwright, H.M.**, S.S. Hubbard, C. Gangodagamage, J.C. Rowland, A. Liljedahl, A. Gusmeroli, B. Dafflon, C. Ulrich, J. Peterson, Y. Wu, C. Wilson, C. Tweedie and S. Wullschleger, “High Resolution Characterization of Heterogeneous Arctic Tundra Subsurface Properties using a Multiscale Bayesian Fusion Approach with Geophysical Datasets”, B53E-0715, AGU Fall meeting, San Francisco, December 2012.
- **Wainwright, H.M.**, S. Finsterle, Q. Zhou, Y. Jung and J. Birkholzer, “iTOUGH2 Global Sensitivity Analysis Module: Applications to CO₂ Storage Systems”, TOUGH Symposium 2012, Lawrence Berkeley National Laboratory, Berkeley, California, September 2012.
- **Wainwright, H.M.**, S. S. Hubbard, C. Gangodagamage, B. Dafflon, C. Ulrich, Y. Wu, C. Wilson, C. Tweedie and S. Wullschleger, “Multiscale Bayesian Fusion Approach using Geophysical and Remote Sensing Data for Characterizing Arctic Tundra Hydrogeochemical Properties”, Tenth International Conference on Permafrost, Salekhard, Russia, June 2012.

- **Wainwright, H.M.**, S. Finsterle, Q. Zhou, J. Birkholzer, “Uncertainty Quantification of the CO₂ Storage System for a Hypothetical GCS Project in the Southern San Joaquin Basin in California”, Conference on Computational Method on Water Resources Research (CMWR), June 2012.
- Hubbard, S. S., C. Gangodagamage, B. Dafflon, **H.M. Wainwright**, J. E. Peterson, A. Gusmeroli, C. Ulrich, Y. Wu, C. Wilson, J. Rowland, C. Tweedie and S.D. Wulfschleger, “Quantifying and relating land-surface and subsurface variability in permafrost environments using LiDAR and surface geophysical datasets”, EGU General Assembly, Vienna, Austria, April 2012.
- Birkholzer, J., G. Bromhal, **H. Wainwright**, Y. Zhang, G. Pau, S. Mohaghegh, S. Amini, G. Zyvoloski, “Predicting Key Reservoir Relationships for Storage Security (with Reduced Order Models)”, 11th Annual Carbon Capture and Sequestration, Utilization (CCUS) Conference, May 2012.
- **Wainwright, H.M.**, D. Sassen, S.A. Bea, J. Chen and S.S. Hubbard “ Reactive Facies: An Approach for Parameterizing Plume-Scale Reactive Transport Models Using Multi-Type Multi-Scale Datasets”, DOE-SBR Annual Meeting, Washington D.C., April 2012.
- **Wainwright, H.M.**, D. Sassen, J. Chen and S.S. Hubbard, “Multiscale Hydrogeophysical Data Assimilation for Plume-scale Subsurface Characterization”, AGU Fall Meeting H52C-06, San Francisco, December 2011.
- **Murakami, H.**, S. Finsterle, Q. Zhou and J.T. Birkholzer, “Uncertainty Quantification and Global Sensitivity Analysis of CO₂ Migration and Pressure Buildup for a Hypothetical GCS Project in the Southern San Joaquin Basin in California”, 11th Annual Conference on Carbon Capture Utilization & Sequestration, Pittsburgh, Pennsylvania, May 2011.
- **Murakami, H.**, X. Chen, M. Hahn, M. Over, M Rockhold, V Vermeul, G Hammond, J Zachara and Yoram Rubin, “Sequential Bayesian Geostatistical Inversion and Evaluation of Combined Data Worth for Aquifer Characterization at the Hanford 300 Area”, AGU Fall Meeting, December 2010.
- Chen, X., **H. Murakami**, M. Hahn, G Hammond, M Rockhold and Y. Rubin, “Three-Dimensional Bayesian Geostatistical Aquifer Characterization at the Hanford 300 Area using Tracer Test Data”, AGU Fall Meeting, December 2010.
- **Murakami, H.**, X. Chen, M.S. Hahn, M.L. Rockhold, V.R. Vermeul and Y. Rubin, “Bayesian Geostatistical Inversion Framework for Probabilistic Risk Assessments of Groundwater Contamination”, Japan Geoscience Union Meeting, Makuhari, Chiba, Japan, May 2010.
- **Murakami, H.**, X. Chen, M.S. Hahn, Y. Liu, M.L. Rockhold, V.R. Vermeul, and Y. Rubin, “Stochastic Three-dimensional Aquifer Characterization at the Hanford 300 Area”, DOE-SBR 5th Annual PI Meeting, Washington D.C., March 2010.
- **Murakami, H.**, X. Chen, M.S. Hahn, Y. Liu, M.L. Rockhold, V.R. Vermeul, Y. Rubin, "Bayesian Geostatistical Inversion Framework for Characterizing Three-Dimensional Hydraulic Conductivity Field: An Application to the Hanford 300 Area", Waste Management symposia, Phoenix, Arizona, March 2010.
- Rubin, Y., F. de Barros, X. Chen, **H. Murakami**, M.S. Hahn, “Elements of a Comprehensive Approach for Modeling Uncertainty”, Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract H51N-01, December 2009.
- **Murakami, H.**, X. Chen, M.S. Hahn, Y. Liu, M.L. Rockhold, V.R. Vermeul, Y. Rubin, "Three-dimensional Characterization of A High-K Aquifer at the Hanford 300 Area and Retrospective Analysis of Experimental Designs", Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract H43F-

1082, December 2009.

- Chen, X., **H. Murakami**, M.S. Hahn, M.L. Rockhold, V.R. Vermeul, Y. Rubin, "Integrating Tracer Test Data into Geostatistical Aquifer Characterization at the Hanford 300 Area", Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract H43F-1095, December 2009.

- **Murakami, H.**, X. Chen, H. Bai, M.L. Rockhold, V.R. Vermeul and Y. Rubin, "Integrating Scale-dependent Hydrogeological Data using a Bayesian Geostatistical Framework", DOE-ERSP 4th Annual PI Meeting, Lansdowne, Virginia, April 2009.

- **Murakami, H.** and Y. Rubin, "A Bayesian Geostatistical Inversion Method for Hydrogeological Data Integration in Probabilistic Risk Assessments", Waste Management symposia, Phoenix, Arizona, March 2009.

- **Murakami, H.** and J. Ahn, "Development of Geologic Repository Models for Design and Decision Making", 16th Pacific Basin Nuclear Conference, Aomori, Japan, 2008.

- **Murakami, H.** and J. Ahn, Development of Compartment Models for Radionuclide Transport in Repository Region, 12th International High-Level Radioactive Waste Management Conference, Las Vegas, Nevada, 2008.

- **Murakami, H.** and J. Ahn, "Compartment Model for a Geologic Repository with Stochastic Approach", Transactions, 95, page 173-174, Winter Meeting, Albuquerque, NM, American Nuclear Society, November 2006.

SCIENTIFIC LEADERSHIP

- Editorial Board: Artificial Intelligence of the Earth Systems
- Editorial Board: Journal of Machine Learning for Modeling and Computing
- Thrust Lead, Watershed Function SFA, DOE-BER, 2019-2021, \$21M total, \$5M budget responsibility
- Co-PI: Advanced Long-term Monitoring Systems, DOE-EM, 2019, \$2.5M/yr total, \$800K budget responsibility
- LBNL PI, COMPASS FME, DOE-BER, \$20 M total, \$800K budget responsibility
- Co-PI, ARPA-e SMART farm, 2020-2022, \$1.6 M total
- PI, SBIR with Subsurface Insights, DOE-BER, 2018-2021, \$300K
- PI, Fukushima restoration and monitoring, JAEA, 2018-, \$50K
- Co-PI, STTR with Arva Intelligence, 2020, \$100K
- PI, Hanford Central Plateau Assessment Review, DOE-EM, \$25K

DOE SERVICE

2020: Co-lead, "AI for Earth Systems Predictability" (AI4ESP) working group, the Department of Energy, Office of Science, Biological Environmental Science, Earth and Environmental Systems Sciences Division

2019: Co-chair, DOE AI Townhall Meetings

2015 – present: Member, U.S. Department of Energy, Ecosystem Science Model-Data Integration Working Group

2014 – present: Deputy lead of the site application thrust in the Advanced Simulation Capability for Environmental Management project (U.S. Department of Energy, Office of Environmental Management)

SCIENTIFIC COMMUNITY SERVICE

2021 - : Editorial Board, Journal of Machine Learning for Modeling and Computing

Jan. 2020: Computational Methods in Water Resources (CMWR) conference, Organizing Committee

Oct. 2020 – present: American Nuclear Society Standard Committee on Remediation of Radioactive Contamination in the Subsurface at Nuclear Facilities

Jan. 2019 – present: Interstate Technology and Regulatory Counsel (ITRC), Sustainable and Resilient Remediation Working Group

Jan. 2019 – present: Federal Remediation Technology Roundtable (FRTR) committee

Jan. 2016 – present: Sustainable Remediation Forum, Technical Initiative Team on Climate Resiliency

Nov. 2016 – present: International Atomic Energy Agency, Modelling and Data for Radiological Impact Assessments (MODARIA) Working Group

Dec. 2014-2020: Session Chair, American Geophysical Union, “Characterizing spatial and temporal variability of hydrological and biogeochemical processes across scales”

Dec. 2015: Organizer, American Geophysical Union, Town Hall Meeting, “A critical gap in data management: integration workflows for models and data.”

Journal reviews: Water Resources Research, Journal of Hydrology, Journal of Environmental Radioactivity, Journal of Geophysical Research – Biogeosciences, Computers & Geosciences, International Journal of Greenhouse Gas Control

LBL SERVICE

2019 present: Lead, LBNL EESA ML Initiative

2020 – present: Area Lead, LBNL AI/ML Coordination Group

2018 – present: Lead, LBNL EESA Environmental Resilience Program

2015 – 2019: Leadership team, Institute for Resilience Communities (<http://www.irc-berkeley.org/>)

2015 – 2019: Member, Diversity and Inclusion Working Group, Lawrence Berkeley National Laboratory, Earth and Environmental Sciences Area.

2015 – 2018: Lead, Digital Ecosystem Initiative Working Group, Lawrence Berkeley National Laboratory, Climate and Ecosystem Sciences Division, Earth and Environmental Sciences Area

2015: Member, Division/Area Reorganization Working Group, Lawrence Berkeley National Laboratory, Climate and Ecosystem Sciences Division, Earth and Environmental Sciences Area.

SUPERVISION/MENTORING

Postdocs

- Qina Yan, Postdoctoral Scholar at LBNL (2019–Present)

- Nicola Falco, Postdoctoral Scholar at LBNL (2016–2020)

Graduate Students

1. Lea Enguehard, Graduate Summer Intern, (2021)
2. Linda Biverly, Graduate Intern, (2021)

3. Anthony Dai, PhD student in Nuclear Engineering at UC-Berkeley (2020–)
4. Sruthi Murali, Visiting Student Intern (2020)
5. Hannah Lu, Graduate Summer Intern (2020)
6. Weiyu Liu, Graduate Summer Intern (2020)
7. Alex Miltenberger, Graduate Summer Intern (2020)
8. Ziqi Li, Graduate Summer Intern (2020)
9. Elizabeth Cotter, Graduate Summer Intern (2020)
10. Shuo Yu, Graduate Summer Intern (2020)
11. Alex Thomas, Graduate Student in Environmental Sciences and Policy Management (2020)
12. Aurelien Meray, Graduate Summer Intern (2020)
13. Dinara Ermakova, PhD student in Nuclear Engineering at UC-Berkeley (2019–)
14. Dajie Sun, PhD student in Nuclear Engineering at UC-Berkeley (2018–)
15. Franziska Schmidt, Master student in Nuclear Engineering at UC-Berkeley (2016–2018)
16. Elizabeth Cotter, Graduate Summer Intern (2020)
17. Ariana Libera, Graduate Summer Intern (2019)

Undergraduate Students

1. Haotian Zheng, Research Assistant (2021)
2. Nivedita Patel, Science Undergraduate Laboratory Internship Program (2021)
3. Orgil Tuvshintugs, Student Research Assistant (2020 – 2021)
4. Dellena Bloom, Undergraduate Research Intern (2020)
5. Savannah Sturla, Undergraduate Research Intern (2019 –)
6. Maya Franklin, Undergraduate Research Intern (2019 –)
7. Jadallah Zouabe, Undergraduate Research Intern (2020 – 2021)
8. Rebecca Serata, Science Undergraduate Laboratory Internship Program, Undergraduate Research Intern (2019 2021)
9. Jashvina Devadoss, Science Undergraduate Laboratory Internship Program (2019)
10. Sarah Trutner, Science Undergraduate Laboratory Internship Program (2016–2017)
11. Caitlin Haedrich, Science Undergraduate Laboratory Internship Program (2017)
12. Christoph Steefel, Student Assistant (2015), currently at UC-San Diego

Highschool Students

- Ishita Suresh, High-school Student Summer Intern (2019 – 2020)

Visiting Scholars

- Akiyuki Seki, Visiting Researcher (2015–2016), currently at Japan Atomic Energy Agency