
CURRICULUM VITAE: Erica R. Siirila-Woodburn

CONTACT INFORMATION

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EDUCATION

Ph.D. 2013 Colorado School of Mines Hydrology	Golden, CO
M.S. 2010 Colorado School of Mines Hydrology	Golden, CO
B.A. 2009 University of Colorado Geology	Boulder, CO

PROFESSIONAL EXPERIENCE

Jan. 2015 – Present	Postdoctoral Fellow Lawrence Berkeley National Laboratory	Berkeley, CA
July 2013 – Jan. 2015	Postdoctoral Researcher Polytechnic University of Catalonia	Barcelona, Spain
Aug. 2012 – May 2013	Instructor Colorado School of Mines	Golden, CO
Aug. 2011 – Dec. 2011	Teaching Assistant Colorado School of Mines	Golden, CO
Jan. 2010 – May 2013	Research Assistant Colorado School of Mines	Golden, CO

PUBLICATIONS

Peer-reviewed Journal Articles in Preparation

- [10] **Siirila-Woodburn, E.R.**, Steefel, C.I., Williams, K.H., Birkholzer, J.T. “The impact of land management decisions on overland flow generation: implications for secondary cesium contamination in forested Fukushima watersheds.”
- [9] **Siirila-Woodburn, E.R.**, Bearup, L., Maxwell, R.M., Steefel, C.I. “Determining the relationship between the water-energy budget and subsurface heterogeneity.”

Peer-reviewed Journal Articles Under Review

- [8] **Siirila-Woodburn, E.R.**, Cihan, A., Birkholzer, J.T. “A risk map methodology to assess the spatial and temporal distribution of leakage into groundwater from Geologic Carbon Storage.” Int. J. Greenh. Gas Control, under review.

Peer-reviewed Journal Articles

- [7] **Siirila-Woodburn, E.R.**, Fernández-García, D., Sanchez-Vila, X. (2015). “Improving the accuracy of risk prediction from particle-based breakthrough curves reconstructed with kernel density estimators.” Water Resour Res, **51**. doi:10.1002/2014WR016394.
- [6] **Siirila-Woodburn, E.R.**, Sanchez-Vila, X., Fernández-García, D. (2015). “On the formation of multiple local peaks in breakthrough curves.” Water Resour Res, **51**. doi:10.1002/2014WR015840.
- [5] **Siirila-Woodburn, E.R.** and Maxwell, R.M. (2015). “A heterogeneity model comparison of highly resolved statistically anisotropic aquifers.” Adv Water Resour, **75**, 53-66. doi:10.1016/j.advwatres.2014.10.011.
- [4] Navarre-Sitchler, A.K., Maxwell, R.M., **Siirila, E.R.**, Hammond, G.E., and Lichtner, P.C. (2013). “Elucidating geochemical response of shallow heterogeneous aquifers to CO₂ leakage using high-performance computing: implications for monitoring of CO₂ sequestration.” Adv Water Resour, **53**,45-55. doi:10.1016/j.advwatres.2012.10.005.
- [3] **Siirila, E.R.** and Maxwell, R.M. (2012). “A new perspective on human health risk assessment: Development of a time dependent methodology and the effect of varying exposure durations.” Sci Total Environ. **431**:221-232. doi:10.1016/j.scitotenv.2012.05.030.
- [2] **Siirila, E.R.** and Maxwell, R.M. (2012). “Evaluating effective reaction rates of kinetically driven solutes in large-scale, statistically anisotropic media: human health risk implications.” Water Resour Res **48**(4):W04527. doi:10.1029/2011WR011516.

- [1] **Siirila, E.R.**, Navarre-Sitchler, A.K., Maxwell, R.M., and McCray, J.E. (2012). “A quantitative methodology to assess the risks to human health from CO₂ leakage into groundwater.” *Adv Water Resour*, **36**. doi:10.1016/j.advwatres.2010.11.005.

Conference Proceedings Articles

Siirila-Woodburn, E.R., A. Cihan, J.T. Birkholzer. The effect of leaky well permeability distribution on probabilistic risk maps in Geologic Carbon Storage. GHGT-13 Conference, Lausanne, Switzerland, 14-18 November, 2016.

Siirila, E.R. and Maxwell, R.M. Effective reaction rates of kinetically driven solutes in large-scale, heterogeneous domains: human health risk implications. PSAM 11 & ESREL 2012 Conference, Helsinki, Finland, 25-29 June, 2012.

Siirila, E.R. and Maxwell, R.M. Evaluating effective reaction rates of kinetically driven solutes in large-scale, statistically anisotropic medial: implications of pore scale mixing and preferential flow pathways at the field scale. 2012 CMWR International Conference, Urbana-Champaign, IL, 17-21 June, 2012.

Siirila, E.R. and Maxwell, R.M. Effective reaction rates of kinetically driven solutes in large-scale, heterogeneous domains: human health risk implications. MODEL CARE Conference, Leipzig, Germany, 18-22 September, 2011.

Atchley, A.L., **Siirila, E.R.**, Maxwell, R.M., Navarre-Sitchler, A.K., McCray, J.E. Using streamlines for highly-resolved reactive transport for CO₂ risk assessment simulations. MODEL CARE Conference, Leipzig, Germany, 18-22 September, 2011.

Siirila, E.R. and Maxwell, R.M. Effective reaction rates of kinetically driven solutes in large-scale, heterogeneous domains: human health risk implications. 2011 MODFLOW and More Conference, Golden, CO, 5-8 June, 2011.

Atchley, A.L., **Siirila, E.R.**, Maxwell, R.M., Navarre-Sitchler, A.K., McCray, J.E. Using streamlines for highly-resolved, reactive transport for CO₂ risk assessment simulations. 2011 MODFLOW and More Conference, Golden, CO, 5-8 June, 2011.

Dissertation and Thesis

Siirila, E.R. (2013). *On the interplay between scaling small-scale reactions, mixing, and aquifer heterogeneity: human health risk implications*. (Doctoral dissertation).

Siirila, E.R. (2010). *A quantitative methodology to assess the human health risks from CO₂ leakage into groundwater*. (Master's thesis).

INVITED CONFERENCE PRESENTATIONS

Siirila-Woodburn, E.R., Steefel, C.I., Williams, K.H., Kitamura, A., Birkholzer, J.T. Using Hydrologic Modeling to Evaluate Forest Remediation Strategies in the Fukushima Prefecture. Second International Symposium for Resilient Communities, Koriyama City, Fukushima Prefecture, Japan 14-15 April, 2016.

Siirila, E.R., Sanchez-Vila, X., Fernández-Garcia, D. On the non-monotonicity and localized peaks of breakthrough curves. 7th IAHR International Groundwater Symposium, Perugia, Italy, 22-24 Sept, 2014 (*Invited key-note*).

CONFERENCE PRESENTATIONS

Siirila-Woodburn, E.R., Steefel, C.I., Moulton, J.D., Dwivedi, D. Anthropogenic triggers on the hyporheic zone: quantifying groundwater-surface water interaction and the impact on water quality. 2016 Fall Meeting, AGU, San Francisco, CA Dec 2016.

Siirila-Woodburn, E.R., Cihan, A., Birkholzer, J. The effect of leaky well permeability distribution on probabilistic risk maps in Geologic Carbon Storage. GHGT-13, Lausanne, Switzerland, 14-18 Nov, 2016.

Arora, B., Steefel, C.I., **Siirila-Woodburn, E.R.,** Dwivedi, D., Kallemov, B., Newcomer, M. Benchmarking integrated surface-subsurface models along a hillslope transect. 2016 SesBench V Subsurface Environmental Simulation Benchmarking Workshop, Coruña, Spain, Oct 13-15, 2016.

Dwivedi, D., Arora, B., Newcomer, M., **Siirila-Woodburn, E.R.,** Steefel, C.I., Moulton, D. Modeling Integrated Surface Subsurface Water Flow and Biogeochemical Cycling in the Hyporheic Zone. 2016 SesBench V Subsurface Environmental Simulation Benchmarking Workshop, Coruña, Spain, Oct 13-15, 2016.

Siirila-Woodburn, E.R., Steefel, C.I., Williams, K.H., Birkholzer, J.T. An integrated hydrologic modeling approach to cesium-137 transport in forested Fukushima watersheds. 2015 Fall Meeting, AGU, San Francisco, CA, 14-18 Dec, 2015.

Siirila-Woodburn, E.R., Cihan, A., Birkholzer, J.T. Determining the Area of Review (AoR) in Carbon Capture and Storage: A tiered, probabilistic methodology to generate risk maps. 2015 Fall Meeting, AGU, San Francisco, CA, 14-18 Dec, 2015.

Siirila-Woodburn, E.R., Fernández-Garcia, D. Sanchez-Vila, X. The effect of heterogeneity models and parameterization on plume distribution and breakthrough curves. 2015 AGU Chapman Conference, Valencia, Spain, 5-8 Oct, 2015.

Siirila, E.R., Fernàndez-Garcia, D. Sanchez-Vila, X. The use of kernel density estimators in breakthrough curve reconstruction and advantages in risk analysis. 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 Dec, 2014.

Siirila, E.R., Sanchez-Vila, X., Fernàndez-Garcia, D. On the non-monotonicity and localized peaks of breakthrough curves. 2014 CMWR International Conference, Stuttgart, Germany, 10-13 June, 2014.

Siirila, E.R., Sanchez-Vila, X., Fernàndez-Garcia, D. On the non-monotonicity and localized peaks of breakthrough curves. 2014 Meeting, EGU, Vienna, Austria, 28 April-2 May, 2014.

Siirila, E.R. and Maxwell, R.M. Propagating uncertainty from hydrology into human health risk assessment. 2013 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec, 2013.

Siirila, E.R. and Maxwell, R.M. Interplay between local and macro dispersive processes resulting from different modeling approaches of aquifer heterogeneity. 2012 Fall Meeting, AGU, San Francisco, CA, 3-7 Dec, 2012.

Siirila, E.R. and Maxwell, R.M. Effective reaction rates of kinetically driven solutes in large-scale, heterogeneous domains: human health risk implications. PSAM 11 & ESREL 2012 Conference, Helsinki, Finland, 25-29 June, 2012.

Siirila, E.R. and Maxwell, R.M. Evaluating effective reaction rates of kinetically driven solutes in large-scale, statistically anisotropic media: implications of pore scale mixing and preferential flow pathways at the field scale. 2012 CMWR International Conference, Urbana-Champaign, IL, 17-21 June, 2012.

Siirila, E.R. and Maxwell, R.M. The effect of macro-kinetic solutes on human health risk with time-dependent exposure. 2012 CMWR International Conference, Urbana-Champaign, IL, 17-21 June, 2012.

Siirila, E.R. and Maxwell, R.M., Evaluating effective reaction rates of kinetically driven solutes in large-scale, anisotropic media: human health risk implications in CO₂ leakage, Abstract H21C-1118. 2011 Fall Meeting, AGU, San Francisco, CA, 5-9 Dec, 2011.

Siirila, E.R. and Maxwell, R.M. Effective reaction rates of kinetically driven solutes in large-scale, heterogeneous domains: human health risk implications. MODEL CARE Conference, Leipzig, Germany, 18-22 Sept, 2011.

Atchley, A.L., **Siirila, E.R.**, Maxwell, R.M. Navarre-Sitchler, A.K., McCray, J.E. Using streamlines for highly-resolved reactive transport for CO₂ risk assessment simulations. MODEL CARE Conference, Leipzig, Germany, 18-22 September, 2011.

Siirila, E.R. and Maxwell, R.M. Effective reaction rates of kinetically driven solutes in large-scale, heterogeneous domains: human health risk implications. 2011 MODFLOW and More Conference, Golden, CO, 5-8 June, 2011.

Siirila, E.R., Navarre-Sitchler, A.K., Maxwell, R.M., Bearup, L.A. and McCray, J.E. A quantitative methodology to assess the risks to human health from CO₂ leakage into groundwater: implications of scaling reaction rates. 10th Annual Carbon Capture and Sequestration Conference, Pittsburgh, PA, May, 2011.

Siirila, E.R., Navarre-Sitchler, A.K., Maxwell, R.M. and McCray, J.E., A quantitative methodology to assess the risks to human health from CO₂ leakage into groundwater, Abstract H53E-1078. 2010 Fall Meeting, AGU, San Francisco, CA, 5-9 Dec, 2010.

Siirila, E.R., Navarre-Sitchler, A.K., Maxwell, R.M., McCray, J.E. A quantitative methodology to assess the risks to human health from CO₂ leakage into groundwater. Geological Society of America, Denver, CO, Oct, 2010.

Atchley, A.L., **Siirila, E.R.**, Navarre-Sitchler, A.K., Maxwell, R.M., McCray, J.E. Improving the assessment of Carbon Capture and Storage risk analysis by proper representation of hydraulic conductivity and dispersive properties. Geological Society of America, Denver, CO, Oct, 2010.

Siirila, E.R., Navarre-Sitchler, A.K., Maxwell, R.M., McCray, J.E. A quantitative methodology to assess the risks to human health from CO₂ leakage into groundwater. Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI) Inc., Boulder, CO, July, 2010.

Maxwell, R.M., **Siirila, E.R.**, Wunsch, A., Peters, L., Atchley, A., Navarre-Sitchler, A.K. and McCray, J. A quantitative methodology to assess the risks to human health from CO₂ leakage into groundwater. 2010 Carbon Capture & Sequestration Conference, Simulation and Risk Assessment session, Pittsburgh PA, 23-25 March, 2010.

McCray, J., Navarre-Sitchler, A.K., Peters, L., **Siirila, E.R.**, Mouzakis, K., Wunsch, A. and Maxwell, R.M. Identifying Aquifers Susceptible to Impacts from CO₂ leakage, 2010 Carbon Capture & Sequestration Conference, Simulation and Risk Assessment session, Pittsburgh PA, 23-25 March, 2010.

TEACHING EXPERIENCE

Spring 2013	Instructor Colorado School of Mines Subsurface Contaminant Transport, 3 credits (24 students)
Fall 2012	Instructor Colorado School of Mines Environmental Risk Analysis, 3 credits (19 students)

Fall 2011 Teaching Assistant
Colorado School of Mines
Environmental Risk Analysis, 3 credits
(13 students)

COMPUTATIONAL GRANTS

- 2016: National Energy Research Scientific Computing Center (NERSC) - Director's Reserve "FP-RadRes: High Performance Flux Prediction Towards Radiological Resilience" (proxy-PI) for 13M core hours
- 2016: National Energy Research Scientific Computing Center (NERSC) - "IDEAS: Ultra High Resolution Hydrologic Modeling of the Upper Colorado River Basin" (proxy-PI) for 3M core hours
- 2015: National Energy Research Scientific Computing Center (NERSC) - Director's Reserve "FP-RadRes: High Performance Flux Prediction Towards Radiological Resilience" (proxy-PI) for 10M core hours
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ACADEMIC ACHIEVEMENTS AND AWARDS

- 2015 American Geophysical Union Early Career Travel Grant, Chapman Conference: The MADE Challenge for Groundwater Transport in Highly Heterogeneous Aquifers, Valencia, Spain
- 2014 *Advances in Water Resources* #1 Top Cited Paper 2012-2013: "A quantitative methodology to assess the risks to human health from CO₂ leakage into groundwater"
- 2013 Student teaching fellowship, Colorado School of Mines Hydrologic Science and Engineering Program, Golden, CO
- 2012 First place oral presentation, Carbon Capture and Storage (CCS) Symposium at the Colorado School of Mines, Golden, CO
- 2010-11 Outstanding M.S. student of the year award, Colorado School of Mines Hydrologic Science and Engineering Program, Golden, CO
- 2005 Multicultural Engineering Program (MEP) Scholarship, University of Colorado, Boulder, CO

PROFESSIONAL ACTIVITIES

Session Convener:

- 2016 Second International Symposium for Resilient Communities, Koriyama City, Fukushima “Radiological and Seismic Resilience”
- 2015 American Geophysical Union Fall Meeting “Biogeoscience processes governing radioisotope transfers after Fukushima and other nuclear accidents”

Journal Reviewer: *Advances in Water Resources, Environmental Research, Environmental Science and Technology, Journal of Hydrology, Stochastic Environmental Research and Risk Analysis, Vadose Zone Journal, Water Resources Research*

Member: American Geophysical Union, European Geophysical Union, Geological Society of America, Opportunities for Postdoc Equity Networking (OPEN) University of California, Berkeley