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**CURRICULUM VITAE: Erica R. Siirila-Woodburn**

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**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

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**PROFESSIONAL EXPERIENCE**

May 2017 – Present	Research Scientist Seaborg Research Fellow Lawrence Berkeley National Laboratory	Berkeley, CA
Jan. 2015 – May 2017	Postdoctoral Fellow Lawrence Berkeley National Laboratory	Berkeley, CA
July 2013 – Dec. 2014	Postdoctoral Researcher Polytechnic University of Catalonia	Barcelona, Spain
Aug. 2011 – May 2013	Teaching Assistant, Instructor Colorado School of Mines	Golden, CO
Jan. 2010 – May 2013	Research Assistant Colorado School of Mines	Golden, CO

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## PUBLICATIONS

### *Peer-reviewed Journal Articles Under Review*

- [16] Maina, F., Rhoades, A., **Siirila-Woodburn, E.R.**, Dennedy-Frank, P.J. “Pairing high-resolution global climate and integrated hydrologic models to assess the impacts of end of century climate extremes on water resources in California”, Earth’s Future, under review.
- [15] Maina, F., **Siirila-Woodburn, E.R.**, Vahmani, P. “On the sensitivity of meteorological forcing resolution on hydrologic metrics.” Hydrol Earth Syst Sci, under review.
- [14] Wainwright, H.M., Trutner, S.D., **Siirila-Woodburn, E.R.**, Williams, K.H., Hubbard, S.S., Carroll, R. “Seasonal effects of temperature and precipitation on snowmelt and streamflow in a headwater catchment in the western US.” Hydrol Earth Syst Sci, under review.

### *Peer-reviewed Journal Articles*

- [13] Maina, F., **Siirila-Woodburn, E.R.**, “The role of subsurface flow on evapotranspiration: a global sensitivity analysis.” Water Resou Res, 56, e2019WR026612, doi.org/10.1029/2019WR026612
- [12] Maina, F., **Siirila-Woodburn, E.R.**, Newcomer, M., Xu, Z., Steefel, C.I. (2020) “Determining the impact of a severe dry to wet transition on watershed hydrodynamics in California, USA with an integrated hydrologic model.” J Hydrol, **580**, 124358, doi.org/10.1016/j.jhydrol.2019.124358.
- [11] Tokunaga, T. K., 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.R.**, Versteeg, R., Raberg, J.H., Peterson, J.E., Hubbard, S.S. (2019) “Depth - and time - resolved distributions of snowmelt - driven hillslope subsurface flow and transport and their contributions to surface waters.” Water Resou Res, **55**, doi.org/10.1029/2019WR025093.
- [10] Maina, F., **Siirila-Woodburn, E.R.**, (2019) “Watersheds dynamics following wildfires: Nonlinear feedbacks and implications on hydrologic responses.” Hydrol Process, 1–18, doi.org/10.1002/hyp.13568.
- [9] **Siirila-Woodburn, E.R.**, Steefel, C.I., Williams, K.H., Birkholzer, J.T. (2018) “The impact of land management decisions on overland flow generation: Implications for cesium migration in forested Fukushima watersheds.” Adv Water Resour, **113**, 42-55, doi.org/10.1016/j.advwatres.2018.01.008.

- [8] **Siirila-Woodburn, E.R.**, Cihan, A., Birkholzer, J.T. (2017) “A risk map methodology to assess the spatial and temporal distribution of leakage into groundwater from Geologic Carbon Storage.” *Int J Greenh Gas Control*, **59**, doi.org/10.1016/j.ijggc.2017.02.003.
- [7] **Siirila-Woodburn, E.R.**, Fernàndez-Garcia, D., Sanchez-Vila, X. (2015). “Improving the accuracy of risk prediction from particle-based breakthrough curves reconstructed with kernel density estimators.” *Water Resou Res*, **51**. doi:10.1002/2014WR016394.
- [6] **Siirila-Woodburn, E.R.**, Sanchez-Vila, X., Fernàndez-Garcia, D. (2015). “On the formation of multiple local peaks in breakthrough curves.” *Water Resou 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 CO<sub>2</sub> leakage using high-performance computing: implications for monitoring of CO<sub>2</sub> 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 Resou 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 CO<sub>2</sub> 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. *Energy Procedia*, 114, 2017 4338-4334. doi.org/10.1016/j.egypro.2017.03.1584.

**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 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 CO<sub>2</sub> risk assessment simulations. MODEL CARE Conference, Leipzig, Germany, 18-22 Sept., 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 CO<sub>2</sub> risk assessment simulations. 2011 MODFLOW and More Conference, Golden, CO, 5-8 June, 2011.

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#### INVITED TALKS

**Siirila-Woodburn, E.R.** Using integrated hydrologic models to understand the impacts of climate extremes on watershed hydrodynamics, Golden, CO, 3, June, 2019. *Invited.*

**Siirila-Woodburn, E.R.** A risk map methodology to assess the spatial and temporal distribution of leakage into groundwater from Geologic Carbon Storage, IEAGHG Modeling and Risk Assessment Meeting, Grand Forks, ND, 20 June, 2018. *Invited.*

**Siirila-Woodburn, E.R.** Using integrated modeling approaches for hydrologic prediction and risk assessment. Los Alamos National Laboratory, Earth and Environmental Science, Science Cafe, 9 March, 2017. *Invited.*

**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, Japan 14-15 April, 2016. *Invited.*

**Siirila, E.R.**, Sanchez-Vila, X., Fernàndez-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.*

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## FUNDED GRANTS

- 2018: University of California Laboratory Fees Research Program, funded from UC office of the president (UCOP). “Headwaters to groundwater: resources in a changing climate”, \$692,000 (LBNL *Proxy-PI*)<sup>1</sup>
- 2017: Early Career Laboratory Directed Research Development (LDRD), Lawrence Berkeley National Laboratory. “A new approach to predicting the effect of climate extremes on California’s water supply”, \$584,000 (*PI*)
- 2017: Early Career Development Grant, Earth and Environmental Science Area, Lawrence Berkeley National Laboratory. “Integrated Hydrologic Modeling of Stormwater Banking into Groundwater”, \$25,000 (*PI*)

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## TEACHING EXPERIENCE

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| Spring 2013 | Instructor, Colorado School of Mines<br>Subsurface Contaminant Transport, 3 credits, 24 students    |
| Fall 2012   | Instructor, Colorado School of Mines<br>Environmental Risk Analysis, 3 credits, 19 students         |
| Fall 2011   | Teaching Assistant, Colorado School of Mines<br>Environmental Risk Analysis, 3 credits, 13 students |

## INVITED LECTURES

**Siirila-Woodburn, E.R.** Watershed-scale Transport: Applications. University of California Berkeley, Nuclear Engineering Department Seminar (NE290E), 6 Feb., 2019.

**Siirila-Woodburn, E.R.** Watershed-scale Transport: Applications. University of California Berkeley, Nuclear Engineering Department Seminar (NE290E), 15 Sept., 2015.

**Siirila, E.R.** CO<sub>2</sub> leakage and risk assessment. Colorado School of Mines, Civil Engineering Department, Geologic Carbon Sequestration (ESGN 598) Seminar, 19 Oct., 2011.

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## SUPERVISEES

### Postdoctoral Fellows:

- P. James Denny-Frank: 2019-present
- Fadji Maina: 2018-present

### Undergraduate interns:

- Melea Emunah (Princeton): 2019

- Lilian Holmes (University of California, Berkeley): 2018
- Ved Bhoot (University of California, Berkeley): 2018
- Sarah Trutner (Oberlin College): 2016-2017

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## ACADEMIC ACHIEVEMENTS AND AWARDS

- 2020 *Hydrological Processes* top downloaded paper award 2018-2019: “Watersheds dynamics following wildfires: Nonlinear feedbacks and implications on hydrologic responses”
- 2017 Seaborg Research Fellowship: Early Career Development Award and selection into the Early Career Enrichment Program. Selection made by laboratory directorate, awarded to only ten scientists from across the laboratory.<sup>2,3</sup>
- 2017 Early Career Development Award, Earth and Environmental Sciences Area, Lawrence Berkeley National Laboratory.
- 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 award 2012-2013: “A quantitative methodology to assess the risks to human health from CO<sub>2</sub> leakage into groundwater”.
- 2013 Student teaching fellowship, Colorado School of Mines Hydrologic Science and Engineering Program.
- 2012 First place oral presentation, Carbon Capture and Storage (CCS) Symposium at the Colorado School of Mines.
- 2011 Outstanding M.S. student of the year award, Colorado School of Mines Hydrologic Science and Engineering Program.
- 2005 Multicultural Engineering Program (MEP) Scholarship, University of Colorado, Boulder.

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## PROFESSIONAL ACTIVITIES

### Scientific Conference Session Convener:

- 2019 American Geophysical Union Fall Meeting “Exploring Linkages Between Headwaters and Groundwaters for Human and Ecosystem Uses in a Changing Climate”
- 2018 American Geophysical Union Fall Meeting “Hydrological Connectivity Between Headwaters to Groundwaters in a Changing Climate”

- 2017 American Geophysical Union Fall Meeting “Understanding the Extent and Impacts of Land Use/Land Cover Change on Water Resources”
- 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 Modeling and Software, Environmental Research, Environmental Science and Technology, Journal of Hydrology, Stochastic Environmental Research and Risk Analysis, Vadose Zone Journal, Water Resources Research*

**Community Service:**

- Member of the technical advisory committee (TAC) for the East Bay Plain Groundwater Sustainability Agency (GSA) for implementation of the Sustainable Groundwater Management Act (SGMA)

**Member:** Institute for Resilient Communities, American Geophysical Union, Lawrence Berkeley National Laboratory Women Scientists Engineers Council (WSEC)

**PRESS RELEASES AND NEWS ARTICLES**

<sup>1</sup> Understanding the effects of climate change on California watersheds (**LBL News Center**)  
<http://newscenter.lbl.gov/2018/03/21/understanding-effects-of-climate-change-on-california-watersheds/>

<sup>2</sup> Lab launches early career development LDRD and early career enrichment program (**LBL News Center**)  
<http://today.lbl.gov/2017/11/30/lab-launches-early-career-development-ldrds-and-early-career-enrichment-program/>

<sup>3</sup> Scientists dig deep to track down California’s ever changing groundwater-supply (**LBL News Center**)  
<http://newscenter.lbl.gov/2018/07/06/scientists-dig-deep-to-track-down-californias-ever-changing-groundwater-supply/>

<sup>4</sup> Is this the answer to California’s water whiplash? (**NPR KCRA**)  
<https://www.kcra.com/article/is-this-the-answer-to-california-s-water-whiplash/20056887>

<sup>5</sup> Like Oil and Water: The Arroyo Grande oil field and nearby domestic drinking wells (**NPR KCBX**)  
<https://www.kcbx.org/post/oil-and-water-arroyo-grande-oil-field-and-nearby-domestic-drinking-wells#stream/0>

<sup>6</sup> How California wildfires can impact water availability (**LBL News Center**)  
<https://newscenter.lbl.gov/2019/09/04/how-california-wildfires-can-impact-water-availability/>

<sup>7</sup> Fire, Then Water: The Landscape After A Burn (**Jefferson Public Radio**)  
<https://www.ijpr.org/post/fire-then-water-landscape-after-burn#stream/0>

<sup>8</sup> Wildfires Affect Water Resources Long After the Smoke Clears (**EOS Earth and Space Science News**)  
<https://eos.org/articles/wildfires-affect-water-resources-long-after-the-smoke-clears>

<sup>9</sup> NERSC shuts down supercomputers amid PG&E blackout (**Data Center Dynamics**)  
<https://www.datacenterdynamics.com/news/nersc-shuts-down-supercomputers-amid-pge-blackout/>

<sup>10</sup> NERSC Powers Research on Post-Wildfire Water Availability (**NERSC News**)  
<https://www.nersc.gov/news-publications/nersc-news/science-news/2019/nersc-powers-research-on-post-wildfire-water-availability/>

<sup>11</sup> There's a silver lining to California's wildfires: More snowpack and water storage, study finds (**Merced Sun Star, Sacramento Bee**)  
<https://www.mercedsunstar.com/news/california/article234766797.html>  
<https://www.sacbee.com/news/california/fires/article234766797.html>

<sup>12</sup> Berkeley Lab study finds California wildfires increase runoff, groundwater (**The Daily Californian**)  
<https://www.dailycal.org/2019/09/10/berkeley-lab-study-finds-california-wildfires-increase-runoff-groundwater/>