

Samuel N Araya, PhD

Data Scientist
Corteva Agriscience (contracted)
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EDUCATION

University of California, Merced Ph.D. in Environmental Systems (Soil Physics) Dissertation: Soil Structure and Land Surface Controls on Soil Hydraulic Properties and Processes <i>Teamrat A. Ghezzehei (Chair), YangQuan Chen, Martha Conklin, Jason Sexton, and Joshua Viers</i>	2019
University of California, Merced M.S. in Environmental Systems (Soil Biogeochemistry) Thesis: Effect of Combustion Temperature on Soil and Soil Organic Matter Properties <i>Asmeret A. Berhe (Chair), Randy Dahlgren, and Samuel Traina</i>	2014
University of Asmara, Asmara, Eritrea B.S. in Land Resources and Environment Thesis: Application of GIS to Derive Surface Parameters for Rainfall-Runoff Modeling at Afdeyu Watershed	2006

EXPERIENCE

Corteva Agriscience, Iowa Data Scientist	2023 – PRESENT
Natural Resources Conservation Service, Texas Soil Scientist	2021 – 2023
Stanford University Postdoctoral Fellow, Soil and Environmental Biogeochemistry Project: Linking surface observations with subsurface biogeochemistry using remote sensing and machine learning Advisor: <i>Scott Fendorf</i>	2019 – 2021

PUBLICATIONS

Peer-reviewed articles

- * Araya, S. N., Mitchell, J. P., Hopmans, J. W., Ghezzehei, T. A. (2022). Long-term impact of cover crop and reduced disturbance tillage on soil pore size distribution and soil water storage. *SOIL*, 8(1), 177–198, <https://doi.org/10.5194/soil-8-177-2022>
- * Araya, S. N., Fryjoff-Hung, A., Anderson, A., Viers, J. H., & Ghezzehei, T. A. (2021). Advances in Soil Moisture Retrieval from Multispectral Remote Sensing Using Unmanned Aircraft Systems and Machine Learning Techniques. *Hydrology and Earth System Sciences*, 25(5), 2739–2758. <https://doi.org/10.5194/hess-25-2739-2021>

- * Araya, S. N., & Ghezzehei, T. A. (2019). Using Machine Learning for Prediction of Saturated Hydraulic Conductivity and Its Sensitivity to Soil Structural Perturbations. *Water Resources Research*, 55(7), 5715–5737, <https://doi.org/10.1029/2018WR024357>
- * Araya, S. N., Fogel, M. L., & Berhe, A. A. (2017). Thermal alteration of soil organic matter properties: a systematic study to infer response of Sierra Nevada climosequence soils to forest fires. *SOIL*, 3(1), 31–44, <https://doi.org/10.5194/soil-3-31-2017>
- * Araya, S. N., Meding, M., & Berhe, A. A. (2016). Thermal alteration of soil physico-chemical properties: a systematic study to infer response of Sierra Nevada climosequence soils to forest fires. *SOIL*, 2(3), 351–366, <https://doi.org/10.5194/soil-2-351-2016>
- * Berhe, A. A., Arnold, C., Stacy, E., Lever, R., McCorkle, E., & Araya, S. N. (2014). Soil erosion controls on biogeochemical cycling of carbon and nitrogen. *Nature Education Knowledge*, 5(8).

Conference proceedings

Papers

- * Araya, S. N., Fryjoff-Hung, A., Anderson, A., Viers, J. H., & Ghezzehei, T. A. (2020). Machine Learning Based Soil Moisture Retrieval from Unmanned Aircraft System Multispectral Remote Sensing. In *IGARSS 2020 - 2020 IEEE International Geoscience and Remote Sensing Symposium*, 4598–4601. <https://doi.org/10.1109/IGARSS39084.2020.9324117>

Selected presentations

- * Araya, S. N., Mitchell J. P., & Ghezzehei T. A. (2019). How 20-Years of Conservation Agriculture Modified Soil Hydraulic Properties: Lab Analysis and Numerical Simulations. Poster presented at the *2019 International Soils Meeting*, San Diego, CA, 6 – 9 January.
- * Araya, S. N., et al. (2018). Estimating Soil Moisture from UAV and Machine Learning. Poster presented at the *2018 AGU Fall Meeting*, Washington, DC, 10 – 14 December.
- * Araya, S. N. & Ghezzehei T. A. (2018). Using Machine Learning for Prediction of Saturated Hydraulic Conductivity and its Sensitivity to Soil Structural Perturbations. Poster presented at the *2018 AGU Fall Meeting*, Washington, DC, 10 – 14 December.
- * Araya, S. N. & Ghezzehei T. A. (2018). Machine Learning to Predict the Effect of Soil Structure on Saturated Hydraulic Conductivity. Oral presentation at the *W-3188: Soil, Water, and Environmental Physics Across Scales Meeting*, Las Vegas, NV, 2 – 4 January.
- * Araya, S. N., Berli M. & Ghezzehei T. A. (2017). Soil moisture recharge estimation: a mass balance approach for quantifying effective precipitation. Poster presented at the *26th Groundwater Resources Association of California Annual Meeting*, Sacramento, CA, 3 – 4 October.
- * Araya, S. N. (2016). Exploring the effectiveness of active learning methods in a discussion class of an introductory environmental science course. Poster presented at the *Assessment as Research Symposium*, UC Merced, 2 March.
- * Araya, S. N. & Berhe A. A. (2014). Effect of Combustion Temperature on Soil and Soil Organic Matter Properties: A Study of Soils from the Western Elevation Transect in Central Sierra Nevada, California. Poster presented at the *2014 AGU Conference*, San Francisco, CA, 15 – 19 December.

TEACHING
Teaching Assistant**University of California, Merced**

Stable Isotope Ecology (BIO 174/ESS 174) – with Prof. Sora Kim	Spring 2019
Fundamentals of Soil Science (ES 170) – with Prof. Asmeret A. Berhe	Spring 2011 & 2017
Contemporary Biology (BIOL 01) – with Profs. K. Dulai; D. Conte; G. Vazquez	Spring 2011, Summer 2015 & 2018
Earth Resources and Society (ESS 010) – with Prof. Asmeret A. Berhe	Spring 2012, 2015 & 2016
Sustainability Science (ESS 002) – with Prof. Teamrat A. Ghezzehei	Fall 2011, 2014 – 2017

Hamelmallo Agricultural College, Eritrea

Fundamentals of Soil Science (LREN 212D)	Fall 2009
Fundamentals of Remote Sensing and GIS (LREN 241) – with Prof. Mussie Tewolde	Fall 2008
Land Use Planning (LREN 202) – with Prof. Tewoldemedhin D. Rustu	Spring 2006 – 2008

Guest Lectures

“The Hydrologic Cycle”, Hydrology and Climate (ESS 110), UC Merced	Fall 2018
“Alternative Energy Sources”, Earth Resources and Society (ESS 010), UC Merced	Spring 2015
“Climate and the Climate Change”, Environment in Crisis (ENVE 010), UC Merced	Spring 2015
“Biodiversity”, Sustainability Science (ESS 002), UC Merced	Fall 2014

Professional Training**Center for Engaged Teaching and Learning (CETL), University of California, Merced**

Instructional Training Certificate	2015 – 2016
Completed a series of workshops and practicum over multiple semesters as part of the UC Merced Instructional Internship Program.	
Mastering the Classroom with First Generation College Students (Certificate)	Fall 2015
Completed semester long practicum in general pedagogy and active learning methods.	

Other Academic Experience

Supervisor for summer intern student	Summer 2020
Environmental Systems, Stanford University	
Supervised a summer intern student as part of the Stanford Summer Undergraduate Research in Geoscience and Engineering Program (SURGE).	
Academic Programming Director	2007 – 2010
Hamelmallo Agricultural College, Eritrea	
Managed the college courses database and scheduled class and exam timetables.	
Prepared semester reports and recommendations to the school dean.	

FELLOWSHIPS

ES Bobcat Summer Fellowship (\$4,600), University of California, Merced	2017
Graduate Student Summer Fellowship (\$3,987), University of California, Merced	2016
Graduate Student Summer Fellowship (\$6,000), University of California, Merced	2015
Graduate Student Summer Fellowship (\$6,600), University of California, Merced	2014
Summer Soil Institute Fellowship (\$900), Colorado State University	2011

PROFESSIONAL SERVICE

Reviewer Board Member

“Soil Systems” journal (ISSN 2571-8789)

2019 – present

Ad Hoc Reviewer

Journal papers (approximately 12/year)

Agronomy; European Journal of Soil Science; Forest Ecology and Management; Geoderma; Geophysical Research Letters; International Journal of Environmental Research and Public Health; Journal of Hydrology; Journal of Hydrometeorology; Revista Brasileira de Ciencia do Solo; Soil; Water Resources Research.

Proposals

Department of Energy (Small Business Innovation Research / Small Business Technology Transfer).

Session Co-Chair

“Soils and Hydrology” session(FR2.R1), IEEE International Geoscience and Remote Sensing Symposium (IGARSS), 2020.

COMPUTING SKILLS

Data analysis and programming

R; Python; JavaScript; MATLAB; SLURM; Git; HYDRUS

Geographic information systems and remote sensing

Google Earth Engine; ArcGIS; QGIS; GRASS GIS; ENVI