Ryoko Araki

PhD candidate,

Joint Doctoral Program at Department of Geography,

San Diego State University, University of California, Santa Barbara

San Diego & Santa Barbara, CA

Email: raraki8159@sdsu.edu
Phone: 619-913-3086
Website: rarakihydro.com

Research Interests

Catchment hydrology, rainfall-runoff dynamics, ecohydrological dynamics, soil moisture

Education

2021–Present	Ph.D. candidate	Joint Program at University of California, Santa Barbara & San Diego State University, Department of Geography **Committee:** Dr. Hilary McMillan, Dr. Kelly Caylor, Dr. Trent Biggs, Dr. Naomi Christina Tague
2021	M.S., Watershed Science	San Diego State University, Department of Geography **Committee:** Dr. Hilary McMillan, Dr. Trent Biggs, Dr. Alicia Kinoshita
2019	B.Eng., *with top 20% honor*	Kyoto University, Department of Civil and Earth Resources Engineering **Advisor:** Dr. Takahiro Sayama

Academic Appointments

2021–Present	Teaching Associate	San Diego State University
2024–Present	Senior Fellow	Quad Fellowship
2023–2024	Fellow	Quad Fellowship
Summer 2023	Research Fellow	NOAA National Water Center, Summer Institute [report]
Winter 2022 & Summer 2021 & Summer 2020	Laboratory Assistant	CW3E, Scripps Institution of Oceanography
2019–2021	Graduate Assistant	San Diego State University

Publications

Published

[1] **Araki, R.**, Mu, Y., McMillan, H. K., "Evaluation of GLDAS soil moisture seasonality in arid climates," *Hydrological Sciences Journal*, vol. 68, 8 2023. DOI: 10.1080/02626667.2023.2206032.

[2] McMillan, H. K., **Araki, R.**, Gnann, S., Woods, R., Wagener, T., "How do hydrologists perceive watersheds? a survey and analysis of perceptual model figures for experimental watersheds," *Hydrological processes*, vol. 37, no. 3, 2023. DOI: 10.1002/hyp.14845.

[3] McMillan, H. K., Coxon, G., **Araki, R.**, Salwey, S., Kelleher, C., Zheng, Y., Knoben, W., Gnann, S., Seibert, J., Bolotin, L., "When good signatures go bad: Applying hydrologic signatures in large sample studies," *Hydrological processes*, vol. 37, no. 9, 2023. DOI: 10.1002/hyp.14987.

[4] **Araki, R.**, Branger, F., Wiekenkamp, I., McMillan, H. K., "A signature-based approach to quantify soil moisture dynamics under contrasting land-uses," *Hydrological processes*, vol. 36, no. 4, e14553, 2022. DOI: 10.1002/hyp.14553.

[5] McMillan, H. K., Gnann, S. J., **Araki, R.,** "Large scale evaluation of relationships between hydrologic signatures and processes," *Water resources research*, vol. 58, no. 6, 2021. DOI: 10.1029/2021wr031751.

[6] Sayama, T., **Araki, R.**, Yamamoto, K., Apip, A., "Characteristics of soil and hillslope runoff in a humid tropical forest and in sumatra, indonesia," *Hydrological Research Letters*, vol. 15, no. 2, pp. 23–30, 2021. DOI: 10.3178/hrl.15.23.

In review

[1] **Araki, R.**, Morgan, B. E., McMillan, H., Caylor, K., *Nonlinear soil moisture loss function reveals vegetation responses to water availability*, In review, Submitted to Geophysical Research Letters, 2024. DOI: 10.22541/essoar.172251989.99347091/v1.

[2] **Araki, R.**, Ogden, F. L., McMillan, H. K., *Testing soil moisture performance measures in the conceptual-functional equivalent to the wrf-hydro national water model*, In review, Submitted to The Journal of the American Water Resources Association, 2024.

[3] Frame, J. M., **Araki, R.**, Bhuiyan, S. A., Bindas, T., Rapp, J., Bolotin, L., Deardorff, E., Liu, Q., Haces-Garcia, F., Liao, M., Frazier, N., Ogden, F. L., *Technical note: Machine learning for a heterogeneous water modeling framework*, In review, Submitted to The Journal of the American Water Resources Association, 2024.

[4] Iyengar, S. A., Foster, M. L., Chelluboyina, G., Ingram, J. D., **Araki, R.**, Perumal, T. V., *Inaugural quad fellows — allies in stem policy for the greater good*, In review, Submitted to Science and Technology, 2024.

[5] Li, B., Sprenger, M., Wyatt, B. M., Gimenez, D., Hirmas, D., Ajami, H., Wiekenkamp, I., Groh, J., Nimmo, J. R., Amato, M., Crompton, O., Singh, N., **Araki, R.**, Xu, T., Sullivan, P. L., *Ubiquity and causes of soil water preferential flow across 18 ecoregions*, In review, Submitted to Geophysical Research Letters, 2024.

[6] McMillan, H., **Araki, R.**, Bolotin, L., Kim, D. H., Coxon, G., Clark, M., Seibert, J., *Global patterns in observed hydrologic processes*, In review, Submitted to Nature Water, 2024.

[7] Morgan, B. E., **Araki, R.**, Trugman, A. T., Caylor, K., *Ecological and hydroclimatic determinants of vegetation water-use strategies*, In review, Submitted to Nature Ecology & Evolution, 2024.

[8] Nimmo, J. R., Wiekenkamp, I., **Araki, R.**, Groh, J., Singh, N., Crompton, O., Wyatt, B. M., Ajami, H., Gimenez, D., Hirmas, D., Sullivan, P. L., Sprenger, M., *Identifying preferential flow from soil moisture time series: Review of methodologies*, In review, Submitted to Vadose Zone Journal, 2024.

[9] Palmer, T. J., Biggs, T., **Araki, R.**, Bagheri, K., Davini, H., Dowing, R., Hutmacher, S., McMillan, H., *Quantifying sources, sinks and mitigation of macroplastic and other river debris: A trash balance model*, In review, Submitted to Science of the Total Environment, 2024.

Conference Presentations

[1] **Araki, R.**, Holt, A., McMillan, H., "Continental-scale prediction of hydrologic signatures and processes," in *The American Geographical Union Fall Meeting 2024*, Washington, DC, United States, 2024.

[2] **Araki, R.**, Morgan, B. E., McMillan, H. K., Caylor, K. K., "Nonlinearity in the soil moisture loss function captures the dynamics of plant water use under water stress," in *The American Geographical Union Fall Meeting 2024*, Washington, DC, United States, 2024.

[3] Keen, R., Billings, S., Sprenger, M., Li, B., Ajami, H., Amato, M., **Araki, R.**, Crompton, O., Gimenez, D., Groh, J., Hirmas, D., Koop, A., Nimmo, J., Singh, N., Wiekenkamp, I., Wyatt, B., Xu, T., Sullivan, P., "Elucidating patterns of preferential flow occurrence across ecosystems and soil profiles to aid future projections of water storage and fluxes," in *The American Geographical Union Fall Meeting 2024*, Washington, DC, United States, 2024.

[4] Li, B., Sprenger, M., Xu, T., Wyatt, B., **Araki, R.**, Xu, T., Singh, N., Groh, J., Hirmas, D., Koop, A., Ajami, H., Gimenez, D., Wiekenkamp, I., Keen, R., Amato, M., Crompton, O., Sullivan, P., "Global identification and prediction of preferential flow occurrence in soils," in *The American Geographical Union Fall Meeting 2024*, Washington, DC, United States, 2024.

[5] Morgan, B., **Araki, R.**, Trugman, A., Caylor, K., "Ecological and hydroclimatic determinants of vegetation water-use strategies," in *The American Geographical Union Fall Meeting 2024*, Washington, DC, United States, 2024.

[6] Shi, J., Liu, H., McMillan, H., Clark, M., **Araki, R.**, "Identifying dominant hydrologic processes in watersheds through hydrologic models and sensitivity analysis," in *The American Geographical Union Fall Meeting 2024*, Washington, DC, United States, 2024.

[7] **Araki, R.**, Bindas, T., Bhuiyan, S. A., Rapp, J., McMillan, H. K., Ogden, F. L., Frame, J. M., "Enhancing the conceptual functional equivalent (CFE) rainfall-runoff model via a differentiable modeling approach," in *The American Geographical Union Fall Meeting 2023*, San Francisco, CA, United States, 2023.

[8] **Araki, R.**, McMillan, H. K., Coxon, G., Kelleher, C., Seibert, J., Salwey, S., Zheng, Y., Bolotin, L., Gnann, S., Knoben, W., "When good signatures go bad: Unintended failures of applying hydrologic signatures in large-sample studies," in *The American Geographical Union Fall Meeting 2023*, San Francisco, CA, United States, 2023.

[9] Bhuiyan, S. A., **Araki, R.**, Bindas, T., Rapp, J., McMillan, H. K., Ogden, F. L., Frame, J. M., "Representing soil physical processes in conceptual framework equivalent (CFE) through the implementation of ordinary differential equation (ODE)," in *The American Geographical Union Fall Meeting 2023*, San Francisco, CA, United States, 2023.

[10] Bindas, T., La Follette, P., Jan, A., Ogden, F. L., Rapp, J., **Araki, R.**, Bhuiyan, S. A., Frame, J. M., "dpLGAR: A differentiable parameter learning implementation of the layered green & ampt with redistribution (LGAR) model," in *The American Geographical Union Fall Meeting 2023*, San Francisco, CA, United States, 2023.

[11] Frame, J. M., Bindas, T., **Araki, R.**, Rapp, J., Bhuiyan, S. A., "On the spontaneous synchronization of hydrologic processes and hydrologic modeling," in *The American Geographical Union Fall Meeting 2023*, San Francisco, CA, United States, 2023.

[12] Frame, J. M., Bindas, T., **Araki, R.**, Rapp, J., Deardorff, E., "Synchronization in hydrologic processes and modeling the response with concepts, physics and neural networks," in *The American Geographical Union Fall Meeting 2023*, San Francisco, CA, United States, 2023. DOI: `10.22541/essoar.171320241.14125931/v1`.

[13] Li, B., Sprenger, M., Xu, T., Nimmo, J. R., Ajami, H., **Araki, R.**, Crompton, O., Gimenez, D., Groh, J., Hirmas, D., Singh, N., Wyatt, B. M., Wiekenkamp, I., Sullivan, P. L., "The occurrence of preferential flow based on high-frequency, multi-depth soil moisture observations across diverse ecoclimate regions," in *The American Geographical Union Fall Meeting 2023*, San Francisco, CA, United States, 2023.

[14] Rapp, J., Frame, J. M., **Araki, R.**, Bindas, T., Bhuiyan, S. A., "Value of hydrofabric artifact static parameters for deep learning next generation national water model (NextGen) development," in *The American Geographical Union Fall Meeting 2023*, San Francisco, CA, United States, 2023.

[15] Wyatt, B. M., Li, B., Ajami, H., **Araki, R.**, Crompton, O., Gimenez, D., Groh, J., Hirmas, D. R., Nimmo, J. R., Singh, N., Spenger, M., Sullivan, P. L., Wiekenkamp, I., Xu, T., "Utilizing high-frequency soil moisture measurements for detection and prediction of preferential flow," ASA-CSSA-SSSA International Annual Meeting, Oct. 2023.

[16] **Araki, R.**, McMillan, H. K., "Does model calibration with soil moisture seasonality as objective metrics improve the reproducibility of streamflow seasonality?" In *The American Geographical Union Fall Meeting 2022*, Chicago, IL, United States, 2022.

[17] Branger, F., **Araki, R.**, Wiekenkamp, I., McMillan, H. K., "Improving hydrological process understanding and model prediction using soil moisture data," European Geophysical Union General Assembly, Vienna, May 2022. DOI: `10.5194/egusphere-egu22-3151`.

[18] **Araki, R.**, McMillan, H. K., Branger, F., Wiekenkamp, I., "Diagnostic tools to differentiate soil moisture dynamics under contrasting land-uses," in *The American Geographical Union Fall Meeting 2021*, New Orleans, LA, United States, 2021.

[19] **Araki, R.**, McMillan, H. K., "Developing diagnostic signatures from in-situ soil moisture networks under different land-uses," in *The American Geographical Union Fall Meeting 2020*, Online, 2020.

[20] **Araki, R.**, Sayama, T., Yamamoto, K., "Characteristics of soil and hillslope runoff in humid tropical forest in sumatra, indonesia," Excellent Presentation Award, in Japanese, Osaka, Japan: Japan Society of Civil Engineers Kansai Chapter Scientific Conference, 2019.

[21] **Araki, R.**, Sayama, T., Yamamoto, K., Apip, A., "Characteristics of soil and hillslope runoff in a humid tropical forest and in sumatra, indonesia: The impact of land-use change," in *The American Geographical Union Fall Meeting, San Francisco, CA*, San Francisco, CA, United States, 2019.

[22] Sayama, T., **Araki, R.**, Yamamoto, K., "Field observation and modeling of rainfall-runoff process in a humid tropical forest in sumatra, indonesia," Chiba, Japan: Annual Conference, Japan Society of Hydrology and Water Resources, 2019. DOI: 10.11520/jshwr.32.0_206.

[23] Sayama, T., **Araki, R.**, Yamamoto, K., Apip, A., Takara, K., "Characteristics of soil and hillslope runoff in humid tropical forest in sumatra, indonesia," DPRI, Kyoto University: JASTIP-WP4 Seminar on Hydrometeorological Disasters in Humid Tropics, Mar. 2019.

[24] Sayama, T., Yamamoto, K., **Araki, R.**, Siska, E. M., Takara, K., "Impact of climate change on hydrological cycle in a humid tropical river basin in sumatra, indonesia," The 8th International Conference on Water Resources and Environment Research, Nanjing, China, May 2019, pp. 12–15. [Online]. Available: https://easychair.org/publications/preprint/klG4.

Awards & Honors

2024-2025	Shida Scholarship, Kyodai Collaborative
2024	Graduate Student Travel Fund, San Diego State University
2024	AGU Ecohydrology Tiny Grant
2024	Graduate Student Association Travel Grant, University of California, Santa Barbara
2023-2024	Quad Fellowship
2019-2023	Japan Student Service Organization Scholarship
2023	McFarland Geography Scholarship, San Diego State University
2022	AGU Water and Society, Tweet-Your-Research Award
2021	General Scholarship, San Diego State University
2020	AGU Hydrology & CUAHSI, Registration Fee Waiver
2020	McFarland Geography Scholarship, San Diego State University
2020	Master's Research Scholarship, San Diego State University
2020	American Association of Japanese University Women Scholarship
2019	Daishin Corporation Scholarship
2019	Best presentation award, the Japan Society of Civil Engineers Kansai Chapter Scientific Conference, Osaka, Japan
2017	Yoshida Kishichiro Fellowship, Kyoto University
2017	Gyomusuper Japan Dream Foundation Scholarship

Teaching & Course Instruction

Fall 2024, Fall 2025	Instructor of record	GEOG375: Environmental Hydrology, San Diego State University (class size: 30)
Spring 2025	Computer Lab Assistant	GEOG578: Practical Hydrologic Modelling, San Diego State University
Fall 2019–Present	Teaching Assistant	GEOG511: Hydrology and Global Environmental Change, GEOG375: Environmental Hydrology, San Diego State University
Spring 2019	Teaching Assistant	U-ENG23: Hydraulics Laboratory Experiments, Kyoto University

Trainings

2025	SCI 696 Introduction to College Teaching, San Diego State University
2023	Techniques of Teaching College Geography Courses, San Diego State University

Mentorship

2023	Asuka Koga	Davani Lab, Master student, Kyoto University
2021–2022	Arian Banaee	McMillan Lab, Undergraduate student, San Diego State University
2021–2022	Pablo Bello	McMillan Lab, Undergraduate student, San Diego State University
2021	Aisha Tangi	McMillan Lab, Undergraduate student, San Diego State University
2020	Sarah Wozniak	McMillan Lab, Undergraduate student, San Diego State University
2019–2020	Amanda Albert	McMillan Lab, Undergraduate student, San Diego State University
2019–Present	5 students (2 in Engineering, 2 in Science, 1 in Agricultural Studies)	Writing support for Japanese undergraduate and Master's students in drafting Statement of Purpose through NPO EXPLANE
2018–2020		Study abroad consultant, Kyoto University
2016–2019		Residential assistant for internatioanl students, Kyoto University

Professional Service

University & Outreaching

2019–Present	President	Blue Gold Graduates, San Diego State University
2023–2024	Research & Funding Liaison	Department of Geography, San Diego State University

Conference

2024	Convener	Nanda, A., Singh, N., Bush, S.A., Sen, S., **Araki., R**. Runoff Generation Processes in Coupled Human and Natural Ecosystems from Plot to Continental Scales. The American Geographical Union Fall Meeting 2023 (H31V), Washington, DC, United States. December 2024.
2023	Convener	Nanda, A., Singh, N., Bush, S.A., Sen, S., **Araki., R**. Runoff Generation Processes: Exploring Thresholds, Sources, and Pathways from Plot to Continental Scales. The American Geographical Union Fall Meeting 2023 (H117), San Francisco, CA, United States. December 2023.

Reviewer

- Water Resources Research (2021, 2022, 2023)
- Journal of Hydrology Regional Studies (2023, 2024)
- Journal of American Society of Agricultural and Biological Engineers (2024)
- AGU Fall meeting OSPA judge (2023, 2024)

Memberships

American Geophysical Union, American Meteorological Society, Asian Americans and Pacific Islanders in Geosciences, Japan Society of Hydrology and Water Resources

Invited Talks & Seminars

2023	Hydrology Research Seminar, Kyoto University, Kyoto, Japan
2021	Alumni Talk, Kyoto University, Kyoto, Japan
2020	Alumni Talk, Kyoto University, Online

Featured Media

- Ryoko's essay about NOAA Internship is featured in CUAHSI News Letter [article]
- Ryoko is featured in Kyoto University Students' Voice [article]
- Ryoko received the best presentation award [article, jp]