RYOKO ARAKI (🔊 *REE-OH-KOH AH-RAH-KEE*)

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EDUCATION

University of California, Santa Barbara (UCSB) and San Diego State University (SDSU)

2021–2026 (Expected)

Ph.D. candidate, Hydrology, Joint Doctoral Program

- Current GPA 4.0/4.0
- Thesis committee: Dr. Hilary McMillan (chair, SDSU), Dr. Kelly Caylor (UCSB), Dr. Trent Biggs (SDSU), Dr. Christina Naomi Tague (UCSB)
- Thesis title (tentative): A signature-based approach to soil moisture analysis and modeling using satellite and in-situ observations

San Diego State University (SDSU)   2019–2021
Master of Science (M.Sc.), Watershed Science

- GPA 4.0/4.0
- Thesis committee: Dr. Hilary McMillan (chair), Dr. Trent Biggs, Dr. Alicia Kinoshita
- Thesis title: A signature-based approach to quantify soil moisture dynamics under contrasting land-uses

Kyoto University   2015–2019
Bachelor of Engineering (B.Eng.), Global Engineering, International Course Program of Civil Engineering

- *Excellent Student Award.* Graduated with Top 20% Distinction in the International and Civil Engineering courses
- *Yoshida Kishichiro Fellowship*. Awarded as one of the top two students in the International Course
- Featured in Student Voice
- Thesis committee: Dr. Takahiro Sayama, the Disaster Prevention Research Institute
- Thesis title: Characteristics of soil and hillslope runoff in humid tropical forest in Sumatra, Indonesia

University of Toronto   2017
Exchange Program (non-degree seeking), Applied Science and Engineering

RELEVANT EXPERIENCE

Teaching and Research Associate   August 2019–Present
San Diego State University | San Diego, CA

- Assisting Dr. Hilary McMillan's research and teaching work
- Supervised undergraduate students' research projects, designed and led field work, implemented literature review, database development and analysis with SQL, prepared papers for publications

- Courses assisted: GEOG375 Environmental Hydrology; GEOG511 Hydrology and Global Environmental Change

Summer Research Fellow   June–July 2023
National Water Center NOAA Office of Water Prediction | Tuscaloosa, AL
- [The outcome is available as report and GitHub repository](#)
- Evaluating alternative numerical scheme for soil moisture module in the Next-gen National Water Model CFE
- Developing differentiable version of CFE, enabling physics-based machine-learning in the Next-gen National Water Model
- Featured in [Newsletter](#)

Laboratory Assistant   Multiple hires in June–August 2020, June–August 2021, January 2022
CW3E Scripps Institution of Oceanography | San Diego, CA
- Investigated performance of National Water Model during rain-on-snow events in the Pacific Northwest
- Created a real-time situational awareness map of rain-on-snow risks for decision-makers

Associate Consultant Intern   June–August 2022
Bain & Company | Tokyo, Japan
- Implemented due diligence on M&A of material business

Policy Maker Intern   June 2018
The Ministry of Land, Infrastructure, Transportation and Tourism | Tokyo, Japan
- Proposed fleet-transport backup scheme for Tokyo Port in an event of earthquake, based on literature review and interview to the officials of Port and Harbor Authority

Civil Engineer Intern   June–July 2017
Tobishima Corporation Myanmar Office | Mandalay, Myanmar
- Designed retaining walls for installing water pipes, prepared contract letters to Myanmar City Development Center, proofread method statements written by the subcontractor, and visited sites with engineers

PUBLICATION

1. McMillan, H., Coxon, G., **Araki, R.**, Salwey, S., Kelleher, C., Zheng, Y., Knoben, W., Gnann, S., Seibert, J., Bolotin, L. (2023). When good signatures go bad: Applying hydrologic signatures in large sample studies. *Hydrological Process* 37(9). [DOI: 10.1002/hyp.14987](#)

2. **Araki, R.**, Mu, Y. & McMillan, H. (2023) Evaluation of GLDAS soil moisture seasonality in arid climates. *Hydrological Sciences Journal* 68(8) 1109-1126. [DOI: 10.1080/02626667.2023.2206032](#)

3. McMillan, H., **Araki, R.**, Gnann, S., Woods, R. & Wagener, T. (2023). How do hydrologists perceive watersheds? A survey and analysis of perceptual model figures for experimental watersheds. *Hydrological Process* e14845. [DOI:10.1002/hyp.14845](#)

4. McMillan, H. K., Gnann, S. J., & **Araki, R. (2022)**. Large-scale evaluation of relationships between hydrologic signatures and processes. *Water Resources Research* e2021WR031751. DOI: 10.1029/2021WR031751

5. **Araki, R**., Branger, F., Wiekenkamp, I., & McMillan, H. (2022). A signature-based approach to quantify soil moisture dynamics under contrasting land-uses *Hydrological Process* e14553. DOI: 10.1002/hyp.14553

6. Sayama, T., **Araki, R**., Yamamoto, K., Apip, A (2021). Characteristics of soil and hillslope runoff in a humid tropical forest and in Sumatra, Indonesia, *Hydrological Research Letters* 15 (2) 23-30. DOI: 10.3178/hrl.15.23

7. **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. Submitted to *The Journal of the American Water Resources Association*. (In review)

8. Frame, J.M., **Araki, R.**, Aafnan Bhuiyan, S., 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. Submitted to *the Journal of the American Water Resources Association*. (In review)

9. Li, B., Sprenger, M., Wyatt, B.M., Gimenez, D., Hirmas, D., Ajami, H., Wiekenkamp, I., Groh, J., Nimmo, J.R., Amato, Matthew., Crompton, O., Singh, N., Araki, R., Xu, T., Sullivan, P.L. Ubiquity and causes of soil water preferential flow across 18 ecoregions. Submitted to *Nature* (In review).

10. McMillan. H., **Araki, R.**, Bolotin, L., Kim, D.H., Coxon, G., Clark, M., Seibert, J. Global patterns in observed hydrologic processes. Submitting to *Nature Water* (In review).

11. Morgan, B.E., **Araki, R.,** Trugman, A.T., & Caylor, K. Ecological and hydroclimatic determinants of vegetation water-use strategies. Submitted to *The Proceedings of the National Academy of Sciences (PNAS)* (In review).

12. **Araki, R.,** Morgan, B.E., McMillan, H. & Caylor, K. Nonlinear Soil Moisture Loss Function Reveals Vegetation Responses to Water Availability. Submitted to Geophysical Research Letters. (In review)

CONFERENCE PRESENTATIONS

1. **Araki, R.,** McMillan H.K., Salwey, S., Kelleher, C., Zheng, Y., Knoben, W., Gnann, S., Seibert, J., Bolotin, L. (2023). When good signatures go bad: unintended failures of applying hydrologic signatures in large-sample studies. Poster presentation at the American Geographical Union Fall Meeting 2023. San Francisco, CA, United States.

2. 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. (2023). The occurrence of preferential flow based on high-frequency, multi-depth soil moisture observations across diverse ecoclimate regions. Poster presentation at the American Geographical Union Fall Meeting 2023. San Francisco, CA, United States.

3. **Araki, R**., Bindas, T., Bhuiyan, S.A., Rapp, J., Ogden, F.L., Frame, J.M. (2023). Enhancing the Conceptual Functional Equivalent (CFE) rainfall-runoff model via a differentiable modeling approach. Poster presentation at the American Geographical Union Fall Meeting 2023. San Francisco, CA, United States.

4. Bhuiyan, S.A., **Araki, R**., Bindas, T., Rapp, J., Ogden, F.L., Frame, J.M. (2023). Representing soil physical processes in Conceptual Framework Equivalent (CFE) through the implementation of Ordinary Differential Equation (ODE). Poster presentation at the American Geographical Union Fall Meeting 2023. San Francisco, CA, United States.

5. Rapp, J., Frame, J.M., **Araki, R**., Bindas, T., Bhuiyan, S.A. (2023). Value of Hydrofabric Artifact Static Parameters for Deep Learning Next Generation National Water Model (NextGen) Development. Poster presentation at the American Geographical Union Fall Meeting 2023. San Francisco, CA, United States.

6. Bindas, T., Follette, P.L., Jan, A., Rapp, J., **Araki, R**., Bhuiyan, S.A., Ogden, F.L., Frame, J.M. (2023). dpLGAR: a differentiable parameter learning implementation of the Layered Green & Ampt with redistribution (LGAR) model. Poster presentation at the American Geographical Union Fall Meeting 2023. San Francisco, CA, United States.

7. **Araki, R**., McMillan, K. (2022) Does model calibration with soil moisture seasonality as objective metrics improve the reproducibility of streamflow seasonality? Poster presentation at the American Geographical Union Fall Meeting 2022 (H12M-0844), Chicago. December 2022. [Abstract]

8. Branger F, **Araki R**, Wiekenkamp I, McMillan H. (2022). Improving hydrological process understanding and model prediction using soil moisture data. Oral presentation at the *EGU General Assembly*, Vienna. May 2022. [Abstract]

9. **Araki, R.,** McMillan, K., (2021) Diagnostic tools to differentiate soil moisture dynamics under contrasting land-uses. Poster presentation at the American Geographical Union Fall Meeting 2021 (H55I-0839), New Orleans. December 2021. [Abstract]

10. McMillan H, Gnann S, **Araki R**. (2021). Large Scale Evaluation of Relationships Between Hydrological Signatures and Processes. Poster presentation at the *AGU Fall Meeting* (H15N-1210), New Orleans. December 2021. [Abstract]

11. **Araki, R.,** McMillan, K., (2020) Developing diagnostic signatures from in-situ soil moisture networks under different land-uses. Poster presentation at the *AGU Fall Meeting* (H195-0005), Online. December 2020. [Abstract]

12. **Araki, R.,** Sayama, T., Yamamoto, K., Apip, A. (2019): Characteristics of soil and hillslope runoff in a humid tropical forest and in Sumatra, Indonesia: the impact of land-use change. Electronic poster presentation at the American Geographical Union Fall Meeting 2019 (B41F-03), San Francisco, CA, United States. December 2019. [Abstract]

13. Sayama, T., **Araki, R.,** Yamamoto, K. (2019): Field Observation and Modeling of Rainfall-Runoff Process in a Humid Tropical Forest in Sumatra, Indonesia [in Japanese]. Presented at Annual Conference, Japan Society of Hydrology and Water Resources, Chiba, Japan. 2019.9.12. DOI:10.11520/jshwr.32.0_206

14. Sayama, T., Yamamoto, K., **Araki, R.,** Apip, A., Siska, E.M., Takara, K. (2019) Rainfall-Runoff-Inundation Processes and Modeling in a Humid Tropical River Basin. Presented at the 8th International Conference on Water Resources and Environment Research, Nanjing, China. [Abstract]

15. **Araki, R.,** Sayama, T., Yamamoto, K. (2019) Characteristics of soil and hillslope runoff in humid tropical forest in Sumatra, Indonesia. Presented at the Japan Society of Civil Engineers Kansai Chapter Scientific Conference, Osaka, Japan. *Excellent Presentation Award.* [Media, in Japanese]

16. Sayama, T., **Araki, R.**, Yamamoto, K., Apip, Takara, K. (2019): Characteristics of Soil and Hillslope Runoff in Humid Tropical Forest in Sumatra, Indonesia, JASTIP-WP4 Seminar on Hydrometeorological Disasters in Humid Tropics, DPRI, Kyoto University, March 2019.

CONFERENCE SESSIONS

Nanda, A., Singh, N., 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.
* Early career convener

AWARD

Shida Scholarship Program, Kyodai Collaborative	2024

- Awarded 2 years of tuition and stipends for Ph.D. study as an alumnus at Kyoto University studying abroad

Quad Fellowships, Schmidt Futures	2023–2024

- Selected as one of the 100 STEM students from the Quad countries (India, Japan, Australia, and the United States), recognized for exceptional contributions
- The Quad is a strategic diplomatic relationship that fosters cooperation in areas including technology and security

Study Abroad Scholarship, Japan Student Service Organization	2021–2023

- Awarded 2 years of tuition and stipends for Ph.D. study

McFarland Geography Scholarship, San Diego State University	2023
Study Abroad Scholarship, Japan Student Service Organization	2019–2021

- Awarded 2 years of tuition and stipends for Master's study

General Scholarship, San Diego State University	2021

McFarland Geography Scholarship, San Diego State University 2020
Master's Research Scholarship, San Diego State University 2020
American Association of Japanese University Women Scholarship 2020
Daishin Corporation Study Abroad Scholarship 2019
- Awarded 1 year of tuition and stipends for Master's study
Fellowship, Kyoto University Yoshida Kishichiro Foundation 2017
Study Abroad Scholarship, Gyomusuper Japan Dream Foundation 2017
- Awarded stipends for studying abroad through Exchange Program

PROFESSIONAL AFFILIATIONS

American Geophysical Union
American Meteorological Society
Asian Americans and Pacific Islanders in Geosciences
Japan Society of Civil Engineers
Japan Society of Hydrology & Water Resources
The Society of Women Civil Engineers

SERVICES

Founder, Blue Gold Graduates, San Diego State University 2019–Present
- Founded a group of watershed science students. Organizing research seminars, career panel, and social events to facilitate the inter-departmental and disciplinary collaborations
Research collaboration and volunteer work with San Diego River Park Foundation 2022–Present
- Participating in river clean-up volunteering
- Research on the origins and volume of marine debris from San Diego River watershed
Funding and Research Liaison, Department of Geography, San Diego State University 2023
Volunteer, NGO Community Road Empowerment [Report] March 2016
- Transferred road-repairing technique with plastic soil-bags in three villages in Myanmar
Public Relations, international students' community iAT, Kyoto University 2016–2017

Journal Reviewer
Water Resources Research 2021, 2022, 2023; Journal of Hydrology Regional Studies 2023, 2024; Journal of American Society of Agricultural and Biological Engineers 2024.

MENTORSHIP EXPERIENCE

Mentor of students who seek to study abroad for their graduate study 2019–Present
- Provided consulting and assistance in drafting Statement of Purpose for 5 students (2 in Engineering, 2 in Science, 1 in Agricultural Studies Department) through NPO XPLANE and alumni network at Kyoto University
Mentor of undergraduate research, San Diego State University 2019–2022
- At McMillan Hydrology Lab. Mentee: Amanda Albert, Sarah Wozniak, Arian Banaee, Pablo Bello, Aisha Tangi
Arranged research visits of a student from Kyoto University February–March 2023
- Invited a female student at the Graduate School of Engineering to visit at Hassan Davani, PhD, PE's research group at San Diego State University
Mentor of students participating in an exchange program, Kyoto University 2018–2020

Mentor of newly-admitted students, International Course Program, Kyoto University 2016–2019

INVITED/KEYNOTE PRESENTATIONS

International course at Kyoto University, Alumni talk (in-person)	2021
International course at Kyoto University, Alumni talk (online)	2020