

# Tristan McKenzie

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\*formerly known as Trista

## EDUCATION

### **Doctor of Philosophy (Ph.D.), Geology and Geophysics**

University of Hawai'i at Mānoa

*Dissertation:* Multi-tracer Approaches for Groundwater Discharge and Anthropogenic Pollution in the Pacific

**Aug. 2018 – Dec. 2020**

Honolulu, Hawai'i

### **Master of Science (M.S.), Geology and Geophysics**

University of Hawai'i at Mānoa

*Report:* Kāne'ōhe Bay and Watershed: A Review of its Hydrogeology, Historical and Current Sources of Pollution and Methods to Quantify Pollutant Fluxes and Sources

**Aug. 2016 - July 2018**

Honolulu, Hawai'i

### **Bachelor of Science (B.S.), Geology and Geophysics**

University of Hawai'i at Mānoa

*Thesis:* Quantifying Atmospheric Fallout of Fukushima-derived Radionuclides in the Hawaiian Islands

**May 2014 - May 2016**

Honolulu, Hawai'i

## RESEARCH EXPERIENCE

### **Postdoctoral Research Fellow** (Supervisor: Isaac Santos)

University of Gothenburg

Marie Skłodowska-Curie Individual Fellowship

- *Planning and execution of field research aboard the R/V Alice aiming to understand benthic fluxes of pharmaceuticals and greenhouse gases in hypoxic and anoxic basins in Sweden*
- *Investigation into relationships between coastal aquifer biogeochemistry and pharmaceutical attenuation in groundwater*

**Sept. 2021 – present**

Gothenburg, Sweden

### **Postdoctoral Research Fellow** (Supervisor: Henrietta Dulai)

University of Hawai'i at Mānoa

Hawai'i EPSCoR 'Ike Wai Postdoctoral Research Fellow

- *Application of deep learning and time-series analysis to geochemical time-series*
- *Supervision of streamflow deep learning undergraduate research project*

**Jan. – May 2021**

Honolulu, Hawai'i

### **Graduate Research Assistant** (Supervisor: Henrietta Dulai)

University of Hawai'i at Mānoa

Hawai'i EPSCoR 'Ike Wai Graduate Fellow

- *Sensor development and deployment*
- *Application of machine learning to long-term time-series*

**Aug. 2019 – Dec. 2020**

Honolulu, Hawai'i

### **Visiting Ph.D. Student** (Supervisor: Isaac Santos)

National Marine Science Centre (Southern Cross University)

Limnology and Oceanographic Exchange Research (LOREX) Fellowship

- *Field and lab analyses of radium, nutrients, and pharmaceuticals in Sydney Harbour*

**June – July 2019**

Coffs Harbour, Australia

### **Graduate Research Assistant** (Supervisor: Mahdi Belcaid)

University of Hawai'i at Mānoa

Hawai'i Data Science Institute Graduate Fellow

- *Development of courses on probabilistic programming and time series analysis*
- *Data analysis and management for the Hawai'i EPSCoR 'Ike Wai project*

**June 2018 – May 2019**

Honolulu, Hawai'i

**Graduate Research Assistant** (Supervisor: Henrietta Dulai)

University of Hawai'i at Mānoa

Sea Grant Graduate Trainee

- *Collection and analysis of contaminants of emerging concern (CECs), radon, nutrients, and trace metals to study groundwater contamination*
- *Analysis of  $\delta^{15}\text{N}-\text{NO}_3^-$  and  $\delta^{18}\text{O}-\text{NO}_3^-$  in water*

**Aug. 2016 – May 2018**

Honolulu, Hawai'i

**Laboratory Assistant**

University of Hawai'i at Mānoa

- *Radiochemical preparation and analysis of soils, mushrooms, and seawater.*
- *Submarine groundwater discharge field and lab methods including radon and radium techniques, nutrient sampling, and carbon chemistry analysis, analytical chemistry laboratory techniques.*

**Jan. 2015 – May 2016**

Honolulu, Hawai'i

**PUBLICATIONS (PEER-REVIEWED)**

1. **McKenzie, T.,** Dulai, H., Fuleky, P., (2021). Traditional and Novel Time-Series Approaches Reveal Submarine Groundwater Discharge Dynamics Under Baseline and Extreme Event Conditions. *Scientific Reports*, 11, 22570. doi: 10.1038/s41598-021-01920-0
2. **McKenzie, T.,** Habel, S., Dulai, H., (2021). Sea-level rise drives wastewater leakage to coastal waters and storm drains. *Limnology and Oceanography Letters*. doi: 10.1002/lol2.10186.
3. **McKenzie, T.,** Holloway, C., Dulai, H., Tucker, J., Sugimoto, R., Nakajima, T., Harada, K., Santos, I.R. (2020). Submarine groundwater discharge and flushing times drive contaminants of emerging concern in the coastal ocean (Sydney, Australia). *Marine Pollution Bulletin*, 160: 111519. doi: 10.1016/j.marpolbul.2020.111519.
4. **McKenzie, T.,** Dulai, H., Chang, J. (2019). Parallels between stream and coastal water quality associated with groundwater discharge. *PLoS ONE*, 14(10): e0224513. doi: 10.1371/journal.pone.0224513.
5. **McKenzie, T.,** & Dulai, H. (2017). Fukushima-derived radiocesium in the Hawaiian Islands. *Journal of Environmental Radioactivity*, 180, 106-113. doi: 10.1016/j.jenvrad.2017.10.003.
6. **McKenzie, T.** (2016). Quantifying Atmospheric Fallout of Fukushima-Derived Radioactive Isotopes in Mushrooms in the Hawaiian Islands. *Mānoa Horizons*, 1, 28-33.

**PUBLICATIONS (NOT PEER-REVIEWED)**

7. Chua, E.J., Beck, H.N., Cohen, A.B., Hintz, C.L., Knotts, E.R., Lauck, M., **McKenzie, T.,** Marín, A.R., Wilkins, K.W., Woodstock, M.S. (2020). *Handbook for International Research Collaborations*. Association for the Sciences of Limnology and Oceanography. [Online] Available: [www.aslo.org/wp-content/uploads/Living-Handbook-International-Collaborations.pdf](http://www.aslo.org/wp-content/uploads/Living-Handbook-International-Collaborations.pdf)
8. Beck, H.N., Cohen, A., **McKenzie, T.,** Weisend, R., Wilkins K.W., Woodstock, M.S. (2019). Broadening Horizons: Graduate Students Participating in International Collaborations Through the Limnology and Oceanography Research Exchange (LOREX) Program. *Limnology and Oceanography Bulletin*, 28(3) 85-89. doi: 10.1002/lob.10339.

**FUNDING****2021****Marie Skłodowska-Curie Individual Fellowship (€203,852)**European Commission, European Union Horizon 2020  
*Horizon 2020 Project "STE CECS"***2019****Fred M. Bullard Fellowship (\$3,000)**

Earth Sciences Department, University of Hawai'i at Mānoa

- 2019**      **GSA On to the Future (OTF) Grant**  
Geological Society of America (GSA)
- 2019**      **Graduate Student Research Grant with Outstanding Mention (\$2,500)**  
Geological Society of America (GSA)  
*One of the top 10 proposals submitted out of 748 in 2019*
- 2018**      **ASLO Limnology and Oceanography Research Exchange (LOREX) Fellowship**  
Association for the Sciences of Limnology and Oceanography (ASLO)
- 2018**      **William T. Coulbourn Fellowship (\$2,500)**  
Dept. Geology & Geophysics, University of Hawai‘i at Mānoa
- 2018**      **Hawai‘i Data Science Institute Fellowship (\$30,000)**  
Hawai‘i Data Science Institute, University of Hawai‘i at Mānoa
- 2018**      **GSO Travel Grant**  
Graduate Student Organization (GSO), University of Hawai‘i at Mānoa
- 2017**      **Fred M. Bullard Fellowship (\$3,000)**  
Dept. Geology & Geophysics, University of Hawai‘i at Mānoa

### HONORS AND AWARDS

- 2020**      **L&O Letters Early Career Publication Award**  
ASLO Limnology & Oceanography (L&O) Letters
- 2020**      **Toby Lee ARCS Award in Earth Sciences (\$5,000)**  
ARCS Foundation Honolulu Chapter
- 2019**      **GSO Merit Award for PhD Research (\$5,000)**  
Graduate Student Organization (GSO), University of Hawai‘i at Mānoa
- 2018**      **GG-OGE Achievement Scholarship (\$1,500)**  
Office of Graduate Education, University of Hawai‘i at Mānoa
- 2018**      **Tester Symposium: Best Rapid-Fire Presentation**  
43<sup>rd</sup> Annual Albert L. Tester Symposium, University of Hawai‘i at Mānoa
- 2016**      **AGU Virtual Poster Showcase Spring 2016 Winner**  
American Geophysical Union (AGU) Multi-Society Showcase

### CONFERENCE PRESENTATIONS

(\* invited, § oral presentation, ° poster, % student advisee, # presented by co-author)

- 2022**      # Falinski, K., **McKenzie, T.**, Dulai, H., Franklin, K., Wegmann, A. Can restoring seabird habitat on remote coralline atolls also improve groundwater resources? Presented at the *Association for the Sciences of Limnology and Oceanography Ocean Sciences Meeting*. Virtual. 28 February– 4 March 2022.
- 2021**      # Janiszewski, H.A., Caplan, C., Chertok, M., Coats, S., **McKenzie, T.**, Okuhata, B.K., Pietruszka, A.J., Ravanis, E., Shea, T., Tachera, D., Zhu, F. Huliāmahi: Overflowing of JEDI Efforts in the Earth Sciences at University of Hawai‘i at Mānoa. Presented at the *American Geophysical Union Fall Meeting*. New Orleans, Louisiana. 13 -17 December 2021.
- 2021**      \*§ **McKenzie, T.**, The importance of coastal groundwater discharge. Presented at the *Swedish Society for Marine Sciences Marine Research Days Conference*. Gothenburg, Sweden. 23-24 November 2021

- 2021** § **McKenzie, T.**, Smith, T.P., Tachera, D., Okuhata, B., Barde-Cabusson, S., Gibson, V., Eason, D. Utilizing Hawaiian language newspapers to identify key water resources in Hawai‘i. *Geological Society of America Cordilleran Section Meeting*. Virtual. 12-14 May 2021.
- 2021** § **McKenzie, T.**, Habel, S., Dulai, H. Sea-Level Rise and Groundwater Inundation Drive Wastewater Pollution to Coastal Waters and Storm Drains. *International Tropical Islands Water Conference*. Virtual. 12-15 April 2021.
- 2021** § **McKenzie, T.**, Dulai, H., Lee, J., Fuleky, P. Assessing the Drivers, Dynamics, and Temporal Variability of Submarine Groundwater Discharge using Traditional and Novel Time-Series Approaches. *International Tropical Islands Water Conference*. Virtual. 12-15 April 2021.
- 2021** % Uehara, B., **McKenzie, T.**, Dulai, H. Streamflow Forecasting Using Recurrent Neural Networks and Transfer Learning. *International Tropical Islands Water Conference*. Virtual. 12-15 April 2021.
- 2021** # Dulai, H., Hudson, C., **McKenzie, T.**, Okuhata, B., Tachera, D., El-Kadi, E. Geochemical signatures of coastal groundwater reflect groundwater flow lines and land-uses in West Hawaii. *International Tropical Islands Water Conference*. Virtual. 12-15 April 2021.
- 2020** **McKenzie, T.**, Dulai, H., Lee, J., Fuleky, P. Upscaling submarine groundwater discharge using local long-term high-resolution radon measurements and deep learning. *American Geophysical Union Fall Meeting*. Virtual. 1-17 December 2020.
- 2020** § **McKenzie, T.**, Dulai, H., Fuleky, P., Lee, J. Assessing submarine groundwater discharge dynamics using long-term high-resolution radon measurements and machine learning. *Goldschmidt Conference*. Virtual. 21-27 June 2020.
- 2020** § **McKenzie, T.**, Holloway, C., Tucker, J., Sugimoto, R., Nakajima, T., Harada, K., Dulai, H., Santos, I.R. Submarine Groundwater Discharge is a Source of Contaminants of Emerging Concern to the Coastal Ocean (Sydney, Australia). *Association for the Sciences of Limnology and Oceanography Ocean Sciences Meeting*. San Diego, California. 16-21 February 2020.
- 2020** § **McKenzie, T.** Adventures in International Collaboration in Australia Through the LOREX Program. *Association for the Sciences of Limnology and Oceanography Ocean Sciences Meeting*. San Diego, California. 16-21 February 2020.
- 2019** \*§ **McKenzie, T.**, Habel, S., Dulai, H. Increased coastal pollution expected under future sea level stands: chemical evidence for tidal groundwater inundation of coastal wastewater infrastructure. *Geological Society of America Annual Meeting*. Phoenix, Arizona. 22-25 September 2019.
- 2019** § **McKenzie, T.**, Dulai, H., Chang, J. Linking baseflow and submarine groundwater discharge: impacts on water quality along the stream-coastal continuum in Kāne‘ohe Bay and Watershed, Hawai‘i. *Association of Limnology and Oceanography Aquatic Sciences Meeting*. San Juan, Puerto Rico. 24 February – 1 March 2019.
- 2018** § **McKenzie, T.**, Dulai, H., Popp, B., Whittier, R. Tracing surface-groundwater pathways of anthropogenic contaminants in Kāne‘ohe Bay Watershed, O‘ahu, Hawai‘i. 7<sup>th</sup> *International Conference on Environmental Future*. Honolulu, Hawai‘i. 16-20 April 2018.
- 2018** § **McKenzie, T.** & Dulai, H. Fukushima-derived radiocesium fallout map of Hawai‘i. *Methods and Applications of Radioanalytical Chemistry Conference*. Kona, Hawai‘i. 8-13 April 2018.

- 2017** ° **McKenzie, T.**, Dulai, H., Popp, B., Whittier, R. Locating Groundwater Pathways of Anthropogenic Contaminants Using a Novel Approach in Kāne‘ohe Watershed, O‘ahu, Hawai‘i. *American Geophysical Union Fall Meeting*. New Orleans, Louisiana. 11-15 December 2017.
- 2017** ° **McKenzie, T.** & Dulai, H. Seasonality of groundwater inputs and associated anthropogenic fluxes in the Kahalu‘u Stream Complex, O‘ahu. *Geological Society of America Cordilleran Section Meeting*. Honolulu, Hawai‘i. 23-25 May 2017.
- 2017** ° **McKenzie, T.** & Dulai, H. Groundwater inputs and their effect on water quality in the Kahalu‘u Stream. *Association of Limnology and Oceanography Aquatic Sciences Meeting*. Honolulu, Hawai‘i. 26 February – 3 March 2017.
- 2017** § **McKenzie, T.** & Dulai, H. Quantifying Atmospheric Fallout of Fukushima-derived Radiocesium in the Hawaiian Islands. *Radiobioassay and Radiochemical Measurements Conference*. Honolulu, Hawai‘i. 6-10 February 2017.
- 2016** ° **McKenzie, T.** & Dulai, H. Quantifying Atmospheric Fallout of Radioactive Isotopes in the Hawaiian Islands (EGU2016-10453). *European Geosciences Union: General Assembly*. Vienna, Austria. 18-22 April 2016.
- 2016** ° **McKenzie, T.** & Dulai, H. Quantifying Atmospheric Fallout of Radioactive Isotopes in the Hawaiian Islands. *AGU Virtual Poster Showcase, Multi-Society Showcase*, Washington DC. Poster. May 2016

#### **INVITED TALKS**

- 2021** Submarine Groundwater Discharge Virtual Seminar  
*Invited seminar speaker to over 40 attendees*
- 2021** Hawai‘i Water Resources Research Center (WRRC) and ‘Ike Wai Seminar  
*Invited seminar speaker with over 100 attendees*
- 2020** Cesspool Researchers, Advisors, and Planners (CRAP) Pau Hana Talk  
*Invited to give a scientific research presentation to members of the CRAP group*
- 2019** Hawai‘i Department of Transportation Harbor Tenant training talks  
*Invited to give a scientific talk to 40-50 (per session) harbor’s tenants taking storm water awareness training (two sessions)*
- 2019** Invited talk at Southern Cross University, Coffs Harbour, Australia  
*Invited to give scientific talk to about 20 staff and students at the National Marine Science Centre*
- 2017** AGU Bright Stars Luncheon Invited Speaker  
*Invited speaker for AGU Bright Stars program (K-12) during the AGU Fall Meeting in New Orleans, Louisiana*

#### **OTHER TALKS**

- 2021** Marine Science Department Seminar Talk (University of Gothenburg)  
*Scientific talk at departmental seminar entitled “Sea-Level Rise Negatively Impacts Coastal Water Quality: A Field-Based Geochemical Study”*
- 2021** Earth Sci Departmental Lightning Talk (University of Hawai‘i)  
*Scientific lightning talk at departmental seminar entitled “Submarine groundwater discharge in Kona”*

- 2020** Earth Sci Departmental Lightning Talk (University of Hawai‘i)  
*Scientific lightning talk at departmental seminar entitled “Upscaling submarine groundwater discharge using radon data and machine learning”*
- 2018** Earth Sci. Departmental Colloquium Talk (University of Hawai‘i)  
*Scientific talk at departmental seminar entitled “Mauka to Makai: Ground and surface water contamination to Kāne‘ohe Bay”*
- 2018** Tester Symposium: 5-minute rapid fire talk (University of Hawai‘i)  
*Scientific talk at Tester Symposium entitled “Tracing groundwater pathways of wastewater using a novel approach in Kāne‘ohe, O‘ahu” to about 200 attendees*
- 2018** Geology & Geophysics Departmental Colloquium Talk (Bullard)  
*Scientific talk at departmental seminar entitled “A novel approach for tracing diffuse pollution pathways”*
- 2017** UH Sea Grant Hanauma Bay Education Program outreach talk  
*Outreach talk entitled “Identifying pollutant pathways: tracing pharmaceuticals into Kāne‘ohe Bay” for about 30 attendees*
- 2017** Interagency Workshop on Ecological Risk Research talk  
*Scientific talk for workshop influencing policy for Ecological Research Assessment in Hawai‘i*
- 2017** Sea Grant Research Symposium  
*Gave scientific talk to Sea Grant researchers*
- 2017** Honolulu Nerd Nite Honolulu Outreach Talk  
*Outreach talk entitled “Urban streams on tropical islands – not the paradise you expect” for about 40 attendees*
- 2016** UH Sea Grant Hanauma Bay Education Program outreach talk  
*Outreach talk entitled “The influence of surface and groundwater inputs on water quality in Kāne‘ohe Bay” for about 30 attendees*

### **MENTORING & TEACHING EXPERIENCE**

- 2021** Instructor  
*Instructor for marine chemistry portion of lower division course entitled “Ocean models and databases” at the University of Gothenburg.*
- 2020** Guest lecturer  
*Coastal Geochemistry graduate course, (nitrogen stable isotopes and water quality research in Hawai‘i, 2 lectures)*
- 2019** Python workshop for Earth Scientists  
*Designed and taught a one-hour workshop on introductory Python programming with a focus on Pandas at the University of Hawai‘i.*
- 2019** Guest lecturer  
*Geological Inquiry (geological cross-sections, 2 lectures)*
- 2018** Guest lecturer  
*Humans and the Environment (water quality, 2 lectures)*
- 2018- 2019** Course development  
*Development of two online 1-credit modules to be offered at the University of Hawai‘i:*
- *Probabilistic programming with PyMC3*
  - *Time-series analysis in Python*

**2018** Graduate REU Assistant  
*Assisted with the NSF Research Experiences for Undergraduates (REU) program by facilitating twice a week meetings and workshops with the REU students. (Summer 2018)*

**2016-present** Students mentored:  
Brody Uehara (BS Computer Science): 2020-2021  
Michael Dodge II (BS Computer Science): 2019-2020  
Sierra Stammer (BS Earth Sciences): 2019-2020  
Jennet Chang (NSF REU Student): 2017  
Eric Welch (BS Global Environmental Science): 2016-2018

### **WORKSHOPS**

**2018** Intelligent Systems for Geosciences (IS-GEO) Workshop - Hilo, Hawai'i  
*Hackathon sensor development and deployment capturing the outskirts of Hurricane Hector*

### **SERVICE**

Review Editor for *Frontiers in Water and Wastewater Management* (**2021 – present**)

Earth Sciences Dept. Diversity, Equity, and Inclusion (DEI) Group (**2020-2021**)

Earth Sciences Dept. Graduate Student Representative to the Graduate Studies Committee (**2019-2020**)

Society of Exploration Geophysicists UH Student Chapter (**2016-2020**)

*Officer: Vice President (2019-2020), Secretary (2016-2018)*

Manuscript reviewer for:

Journal of Radioanalytical and Nuclear Chemistry

Journal of Hydrology

Hydrogeology Journal

Limnology & Oceanography

Limnology & Oceanography Methods

Applied Radiation and Isotopes

Journal of Geophysical Research – Oceans

Frontiers in Water and Wastewater Management

Frontiers in Environmental Science

Environmental Health Insights

### **PROFESSIONAL MEMBERSHIPS**

**2018 – present** Geological Society of America

**2017 – present** Association for the Sciences of Limnology and Oceanography

**2016 – present** American Geophysical Union

### **MEDIA APPEARANCES AND INTERVIEWS**

**2021** Interview with Hawai'i News Now: This is Now (*Mar. 2021*)

**2020** ARCS Meet the Scholar Interview  
[Interview](#) with ARCS Honolulu Chapter (*Sep. 2020*)

**2020** GSA My OTF Experience Interview  
[Interview](#) with GSA (*Jan. 2020*)

**2019** AGU Paths through Science Interview  
[Interview](#) with AGU Narratives (*Apr. 2019*)

**2017** Sea Grant Educational Podcast  
*Outreach [podcast](#) (May 2017)*

**2017** Voice of the Sea TV Program  
*Episodes [4-1](#) and [4-2](#) (Feb. 2017)*

### **OUTREACH ACTIVITIES**

**2021** Better Poster Workshop Coach  
*Coached students on how to create a better scientific poster (Feb. 2021)*

**2020** Radford High School Outreach (EP<sup>+</sup>IK Program)  
*Taught hydrology and water quality to high schoolers (Oct. 2020)*

**2019** Kahala Elementary Science Showcase  
*Outreach activity for 75 4<sup>th</sup> graders (Dec. 2019)*

**2019** SOEST Semi-Annual Open House  
*Outreach event for over 6,000 K-12 attendees (Oct. 2019)*

**2019** ASLO Instagram Takeover  
*Posted content to ASLO's Instagram for 1 day (July 2019)*

**2019** AGU Instagram Takeover  
*Posted content to AGU's Instagram for 3 days (July 2019)*

**2019** ASLO LOREX Blog  
*Wrote 5 [blogs](#) about experiences with international collaboration (Summer 2019)*

**2018** Hawai'i Sea Grant Poster Symposium  
*Scientific poster presentation for Sea Grant representatives (Dec. 2018)*

**2018** Windward District Science Fair Judge  
*Judge of middle school science fair projects (Feb. 2018)*

**2017** AGU Near-Peer Undergraduate Mentoring Session  
*Participated as a mentor for undergraduate students during the AGU Fall Meeting in New Orleans, Louisiana (Dec. 2017)*

**2017** SOEST Semi-Annual Open House  
*Outreach event for over 6,000 K-12 attendees (Oct. 2017)*

**2017** Roosevelt High School Science Outreach  
*Outreach event for high school students (Apr. 2017)*

**2017** Bishop Museum Fall in Love with Science Outreach  
*Outreach event for children and their families (Feb. 2017)*

**2017** UH Sea Grant Hanauma Bay Volunteer Education Event  
*Outreach event for about 40 Hanauma Bay volunteers (Jan. 2017)*