HENRIETTA DULAI

Professor, University of Hawai'i at Manoa, Department of Earth Sciences
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http://www.soest.hawaii.edu/GG/FACULTY/hdulaiov/

UPDATED: AUGUST 2023

EDUCATION

Ph.D. in Chemical Oceanography **2005**
FLORIDA STATE UNIVERSITY, DEPARTMENT OF OCEANOGRAPHY **TALLAHASSEE, FLORIDA, USA**
Dissertation Thesis: Multiple Isotopic Tracers for Study of Coastal Hydrological Processes

M.S. in Nuclear Chemistry **1997**
CZECH TECHNICAL UNIVERSITY **PRAGUE, CZECH REPUBLIC**
SCHOOL OF NUCLEAR SCIENCES AND PHYSICAL ENGINEERING
Thesis: Determination of Uranium by Gamma-Spectrometry

Certificate in Education – Pedagogy of STEM Subjects **1997**
CZECH TECHNICAL UNIVERSITY **PRAGUE, CZECH REPUBLIC**
MASARYK INSTITUTE OF ADVANCED STUDIES

PROFESSIONAL EXPERIENCE

Professor **August 2021 - present**
Associate Professor **August 2014 - 2021**
Assistant Professor **January 2009 – August 2014**
UNIVERSITY OF HAWAII, DEP. OF EARTH SCIENCES/GEOLOGY AND GEOPHYSICS
Affiliate Faculty **January 2012 - present**
UNIVERSITY OF HAWAII, WATER RESOURCES RESEARCH CENTER
Postdoctoral Scholar & Postdoctoral Investigator **November 2005 – November 2008**
WOODS HOLE OCEANOGRAPHIC INSTITUTION
DEPARTMENT OF MARINE CHEMISTRY AND GEOCHEMISTRY
Graduate Research Assistant **May 2000 – October 2005**
FLORIDA STATE UNIVERSITY, DEPARTMENT OF OCEANOGRAPHY
Research Specialist **September 1997 – May 2000**
CZECH NATIONAL RADIATION PROTECTION INSTITUTE
Graduate Research Assistant **September 1995 – July 1997**
CZECH TECHNICAL UNIVERSITY

TEACHING EXPERIENCE (LAST 5 YEARS)

Undergraduate Courses: GG106/SUST116 Humans and the Environment (F22, F21, F20, F19, F18), GG200 Geologic Inquiry (S23, F22, S22, S21, S19, S16, S14), SCI295 at KCC (F18, S19)
Graduate Courses: GG640 Coastal Geochemistry (S20), ERTH654 Groundwater Contamination (F20)

ACADEMIC ADVISING

Undergraduate student principal thesis advisor: Tehani Malterre (BS 2023), Brandon DelaCruz (BS 2023), Eric Welch (BS 2018), Elizabeth Dionne (BS 2017), Hannah Azouz (BS 2016), Tristan McKenzie (BS 2016), Alana Kleven (BS 2015), Kim Mayfield (BS 2014)
Graduate student principal advisor and sponsor: Jobel Y. Villafañe-Pagán (MS current), Hailey Pantaleo (MS current), Yunxuan Zhong (MS current), Kelly Truax (MS 2020, PhD 2023), Casey McKenzie (MS 2023), Tristan McKenzie (MS 2018, PhD 2020), Eric Welch (MS 2019), Elizabeth Dionne (MGeo 2018), Catherine Hudson (MS 2018), Hannah Azouz (MS 2017), Christina Richardson (MS 2016), Camille Vautier (MS 2016), Samuel Wall (MS-), Christine Waters (MS 2014), Gabrielle Weiss (MS-), Kamila Stastna (MS-visiting)
Postdoctoral scholar advisor and sponsor: Jan Kamenik (now Czech Academy of Sciences), Olkeba Tolessa Leta (now St. Johns River Water Management District), Veronica Gibson (Heeia NERR)

PEER REVIEWED PUBLICATIONS 2018-PRESENT

[x]student advisee *postdoctoral advisee
Google scholar: http://go.hawaii.edu/3bB

1. Haag, J., H. Dulai, W. Burt, 2023. The role of submarine groundwater discharge to the input of macronutrients within a macrotidal subpolar estuary. Estuaries and Coasts. 1-6. https://doi.org/10.1007/s12237-023-01231-9
2. Okuhata, B.K., J.M.S. Delevaux, A.R. Donna, C.M. Smith, V.L. Gibson, H. Dulai, A.I. El-Kadi, K. Stamoulis, K.M. Burnett, C.A. Wada, L.L. Bremer, 2023 Effects of multiple drivers of environmental change on native and invasive macroalgae in nearshore groundwater dependent ecosystems. Water Resources Research, 59, e2023WR034593, https://doi.org/10.1029/2023WR034593
3. Watson, S.J., Arisdakessian, C., Petelo, M. et al. 2023. Geology and land use shape nitrogen and sulfur cycling groundwater microbial communities in Pacific Island aquifers. ISME COMMUN. 3, 58. https://doi.org/10.1038/s43705-023-00261-5
4. Ghazal, K. A., O. T. Leta, H. Dulai;, 2023. Spatiotemporal estimation of fresh submarine groundwater discharge across the coastal shorelines of Oahu Island, Hawaii. *Blue-Green Systems*, bgs2023010. doi: https://doi.org/10.2166/bgs.2023.010
5. McKenzie, T., H. Dulai, J. Lee, N. T.Dimova, I.R. Santos, B. Zhang, W.C. Burnett, 2023. Using Deep Learning to Model the Groundwater Tracer Radon in Coastal Waters, *Water Resources Research*, 2022WR033870RR accepted (1).
6. Adyasari, D., N. T. Dimova, H. Dulai, B. S. Gilfedder, I. Cartwright, T. McKenzie, P. Fuleky, 2023. Radon-222 as a groundwater discharge tracer to surface waters. *Earth-Science Reviews*, 104321 (1).
7. Truax[x], K. Dulai, H. Misra, A., Kuhne, W., Fuleky, P. 2022. Quantifying Moss Response to Metal Contaminant Exposure Using Laser-Induced Fluorescence. *Applied Sciences* 12,11580. https://doi.org/ 10.3390/app122211580 (7)
8. Okuhata, B.K., D.M. Thomas, H. Dulai, B.N. Popp, J. Lee and A.I. El-Kadi, 2022. Inference of young groundwater ages and modern groundwater proportions using chlorofluorocarbon and tritium/helium-3 tracers from West Hawai'i Island. *Journal of Hydrology*, 609 https://doi.org/10.1016/j.jhydrol.2022.127755 (3)
9. Okuhata, B.K., El-Kadi, A.I., Dulai, H., J. Lee, C.A. Wada, L.L Bremer, K.M. Burnett, J.M.S. Delevaux, C. Shuler. 2022. A density-dependent multi-species model to assess groundwater flow and nutrient transport in the coastal Keauhou aquifer, Hawai'i, USA. *Journal of Hydrogeology*, 30, 231-250. https://doi.org/10.1007/s10040-021-02407-y (9)
10. Dulai, H., C. Smith, V. Gibson, L. Bremer, D. Amato, 2023. Risk to native marine macroalgae from land-use and climate change related modifications to groundwater discharge in Hawai'i. Limnology and Oceanography Letters, 2378-2242, https://doi.org/10.1002/(ISSN)2378-2242 (9)
11. McKenzie[x], T.A., H. Dulai and P. Fuleky, 2021. Traditional and novel time-series approaches reveal submarine groundwater discharge dynamics under baseline and extreme event conditions, *Scientific Reports*, 11:22570, https://doi.org/10.1038/s41598-021-01920-0 (16)
12. Wada, C., K. Burnett, B.K. Okuhata, J.M.S. Delevaux, H. Dulai, A.I. El-Kadi, V. Gibson, C. Smith, L. Bremer, 2021. Identifying wastewater management tradeoffs: costs, nearshore water quality, and implications for marine coastal ecosystems in Kona, Hawai'I, *PLoS ONE* PONE-D-21-17746R1 (11)
13. McKenzie[x], T.A, S. Habel., H. Dulai, 2021. Sea-level rise drives wastewater leakage to coastal waters and storm drains. *Limnology and Oceanography Letters,* 6: 154-163. https://doi.org/10.1002/lol2.10186 (25)
14. Attias, E., S. Constable, D. Sherman, K. Ismail, C. Shuler, H. Dulai, 2021. Marine electromagnetic imaging and volumetric estimation of freshwater plumes offshore Hawai'i. *Geophysical Research Letters*, 48, e2020GL091249. https://doi.org/10.1029/2020GL091249 (10)
15. Volta, C., Ho, D. T., Maher, D. T., Wanninkhof, R., Friederich, G., Del Castillo, C., & Dulai, H., 2020. Seasonal variations in dissolved carbon inventory and fluxes in a mangrove-dominated estuary. *Global Biogeochemical Cycles*, 34, e2019GB006515. https://doi.org/ 10.1029/2019GB006515 (10)
16. Ghazal, K.A., O.T. Leta, A.I. El-Kadi, H. Dulai, 2020. Impact of coastal wetland restoration plan on the water balance components of Heeia watershed, Hawaii. *Hydrology*, 7(4), 86. (3)

17. McKenzie[x], T., C. Holloway, H. Dulai, J.P. Tucker, R. Sugimoto, T. Nakajima, K. Harada, I.R. Santos, 2020. Submarine groundwater discharge: A previously undocumented source of contaminants of emerging concern to the coastal ocean (Sydney, Australia), *Marine Pollution Bulletin*, 160, https://doi.org/10.1016/j.marpolbul.2020.111519 (22)
18. Okuhata[x], B., H. Dulai, C. Shuler, J. Fackrell, A. El-Kadi, 2020. Metal mobilization as an effect of anthropogenic contamination in groundwater aquifers in Tutuila, American Samoa. *Water*. 12, 2118. (1)
19. Engels, J.L., S. Watson, H. Dulai, K.M. Burnett, C.A. Wada, A. Aga, N. DeMaagd, J. McHugh, B. Sumida, L.L. Bremer, 2020. Collaborative research to support urban agriculture in the face of change: The case of the Sumida watercress farm on Oʻahu. *PLoS ONE* 15(7): e0235661. https://doi. org/10.1371/journal.pone.0235661 (4)
20. Shuler, C., H. Dulai, O. T. Leta, J. Fackrell, E. Welch, A. El-Kadi, 2020. Understanding surface water-groundwater interaction, submarine groundwater discharge, and associated nutrient loading in a small tropical island watershed. *Journal of Hydrology,* 585. (11)
21. Dudley, B., F. Hughes, G. Asner, J. Baldwin, Y. Miyazawa, H. Dulai, C. Waters, J. Bishop, N. Vaughn, J. Yeh, S. Kettwich, R. MacKenzie, R. Ostertag, T. Giambelluca, 2020. Hydrological effects of tree invasion on a dry coastal Hawaiian ecosystem. *Forest Ecology and Management*, 458. (5)
22. McKenzie[x], T., H. Dulai., J. Chang[x], 2019. Parallels between stream and coastal water quality associated with groundwater discharge. *PLOS ONE*, 14(10):e0224513. doi: 10.1371/journal.pone.0224513. (7)
23. Welch[x], E., H. Dulai, A. El-Kadi, C.K. Shuler, 2019. Submarine groundwater discharge and stream base flow sustain pesticide and nutrient fluxes in Faga'alu Bay, American Samoa, *Frontiers in Environmental Sciences, Water and Wastewater Management*, 7 (162), https://doi.org/10.3389/fenvs.2019.00162. (19)
24. Amato, D., R. Whittier, H. Dulai, C. Smith, 2019. Algal bioassay detect modeled loading of wastewater-derived nitrogen in coastal waters of Oahu, Hawaii. *Marine Pollution Bulletin*. 10.1016/j.marpolbul.2019.110668. (18)
25. Taniguchi M., H. Dulai, K. M. Burnett, I. R Santos, R. Sugimoto, T. Stieglitz, G. Kim, N. Moosdorf, W. C. Burnett, 2019. Submarine Groundwater Discharge: Updates on its Measurement Techniques, Geophysical Drivers, Magnitudes and Effects. *Frontiers in Environmental Science, section Water and Wastewater Management*, 7 (141), https://doi.org/10.3389/fenvs.2019.00141. (176)
26. Ghazal[x], K.A., O.T. Leta*, A.I. El-Kadi, H. Dulai, 2019. Assessment of wetland restoration and climate change impacts on water balance components of the Heeia coastal wetland in Hawaii. *Hydrology* 6, 37. (12)
27. Shuler, C.K., D.W, Amato, V. Gibbson, L. Baker, A.N. Olguin, H. Dulai, C.M. Smith, and R.A. Alegado, 2019. Assessment of Terrigenous Nutrient Loading to Coastal Ecosystems along a Human Land-Use Gradient, Tutuila, American Samoa. *Hydrology* 6, 18, 1-27. (17)
28. Kelly[x], J.L., H. Dulai, C.R. Glenn, P.G. Lucey, 2019. Integration of aerial infrared thermography and in situ radon-222 to investigate submarine groundwater discharge to Pearl Harbor, Hawaii, USA. *Limnology and Oceanography*, 64, 238-257. (41)
29. Ghazal[x], K.A., O.T. Leta*, A.I. El-Kadi, H. Dulai, 2018. Quantifying dissolved silicate fluxes across Heeia shoreline in Hawaii via integrated hydrological modeling approach. *Universal Journal of Geoscience*. 6(5), 147-157. (5)
30. Shuler, C.K., H. Dulai, R. DeWees, M. Kirs, C.R. Glenn, A.I. El-Kadi, 2018. Isotopes, microbes, and turbidity: A multi-tracer approach to understanding recharge dynamics and groundwater contamination in a basaltic island aquifer, *Groundwater Monitoring & Remediation*. 39(1), 20-25. doi:10.1111/gwmr.12299 (9)
31. Leta*, O.T., A.I. El-Kadi, H. Dulai, K.A. Ghazal, 2018. Assessment of SWAT model performance in simulating daily streamflow under rainfall data scarcity in Pacific Island watersheds. *Water*, 10 (11). (25)

PUBLICATIONS (NON-PEER REVIEWED) 2018-PRESENT

32. Dulai, H., I.R. Santos, Taniguchi, M., R. Sugimoto, A. Mukherjee, 2021. Editorial to special issue: Submarine Groundwater Discharge: Impacts on Coastal Ecosystem by Hidden Water and Dissolved Materials, *Frontiers in Environmental Sciences, Water and Wastewater Management 8,* 10.3389/fenvs.2020.629509.
33. Smith, J.R., L. Watling, L., N. Summers, E.B. Roark, N. Morgan, B. Lensing, S.C. France, H. Dulai, G.S. Carter, S. Bingo, and Amy Baco-Taylor, 2020. Exploring for a Biogeographic Boundary along the Emperor Seamount Chain: A Multidisciplinary Approach, in Raineault, N.A, and J. Flanders, eds. New Frontiers in Ocean Exploration: The E/V Nautilus, NOAA Ship Okeanos Explorer, and R/V Falkor 2019 field season. *Oceanography* 33(1), supplement, 122 pp., https://doi.org/10.5670/oceanog.2020.supplement.01.

GRANTS 2018-PRESENT

1. NSF: Climate change impacts on the past and future coastal freshwater resources of oceanic islands. and REU supplement PI: C. Lipo, Binghamton U, UH subaward PI: H. Dulai. Funding period: September 1, 2022 - August 31, 2026.
2. NOAA NSC Collaborative Research: Wetland Water and ʻIke (WAI): Improving understanding of hydrology to inform management decisions, PI: S. Rii, Co-I and Technical Lead: H. Dulai, Funding period: October 1, 2022- September 30, 2024.
3. USGS WRRC: Characterizing network-wide, spatially explicit current and future stream temperature distribution. PI: H. Dulai. Co-PIs: Y-P. Tsang and K. Falinsk,i Funding period: September 1, 2022 - August 31, 2024.
4. NOAA CRCP: Investigating the role of groundwater in pollutant transport to Nu`uuli Pala Lagoon, American Samoa. PI: K. Knee AU, UH subaward PI: H. Dulai. Funding period: August 1, 2019-January 31, 2021.
5. DOE Consortium for Monitoring, Technology, and Verification. UH subaward PI: Milton Garces, co-PIs: H. Dulai & J. Learned. Funding period: August 1, 2019- July 31, 2024.
6. NSF EPIK: Project EPIK - Earth, Planets, Ike, and Kuleana - Preparing the next generation of diverse geoscientists in Hawaiʻi. PI: B. Smith-Konter, co-PIs: H. Dulai, J Engels, J. Konter, S. Rowland. Funding period: August 1, 2019- July 31, 2022.
7. UH Sea Grant (NOAA): Tracking groundwater nutrients using novel tracers to inform coastal watershed management in South Kōhala, Hawai'i. PI: H. Dulai, co-PI: K. Falinksi. Funding period: February 1, 2020-January 31, 2022.
8. County of Kauai: Hydrological Investigation at Kauaʻi Salt Pond, PI: R. Papp, co-PIs: H. Dulai, A. El-Kadi, N. Grobbe, N.Lautze. Funding period: March 1, 2019-October 31, 2020.
9. UH Strategic Investment Initiative: Strategic Monitoring And Resilience Training in the Ala Wai Watershed – SMART Ala Wai, PI: B. Glazer, project contributor: H. Dulai. Funding period: 2018-2019.
10. NSF ASPIRE: Groundwater sustainability for small farmers of Oʻahu. PI: J. Engels, water quality lead H. Dulai. Funding Period: May 1, 2018-April 30, 2019.
11. NOAA OER: The Current Wall: Exploring the Bathyal Biogeography of the Emperor Seamounts. PI: J. Smith, co-PIs H. Dulai, L. Watling, G. Carter. Funding period: January 1, 2017-August 30, 2020.
12. NSF EPSCoR: Ike Wai: Securing Hawaii's Water Future. UH institutional proposal PI G. Jacobs, Dulai – SGD group lead. Funding period: May 1, 2016 – April 30, 2021.

PROFESSIONAL ACTIVITIES

INTERNATIONAL SERVICE:

Expert delegated by the International Atomic Energy Agency, 2017 Expert Mission: Applying Isotope Hydrology to the Study of Surface and Groundwater Mixing in the Unconsolidated Aquifer Along Lower Ping River, Thailand

EDITORSHIP:

Associate Editor: Limnology & Oceanography Letters

Associate Editor: Marine Chemistry
Associate Editor: Frontiers Environmental Science - Water and Wastewater Management

Special Issues Guest Editor:
Frontiers Environmental Science - Water and Wastewater Management: Submarine Groundwater Discharge: Research progress during the last two decades.
Marine Chemistry: Radium and radon tracers in aquatic systems.
Journal of Environmental Radioactivity: Measurement and Application of Radium and Radon Isotopes in Environmental Sciences.

PROFESSIONAL AFFILIATIONS

American Geophysical Union
American Society of Limnology and Oceanography

GRADUATE STUDENT COMMITTEES

Reed Mershon EPS, PhD current (comprehensive exam committee)
Luis Dasilveira EPS, PhD current (comprehensive exam committee)
Samuel Kei Takazawa EPS, PhD current (comprehensive exam committee)
Theodore Brennis EPS, PhD current (comprehensive exam committee)
Elizabeth Benyishek EPS, PhD current (comprehensive exam committee)
Natalia Gauer Pasqualon EPS, PhD current (comprehensive exam committee)
Maria MacNeill EPS, MS 2022 (committee member)
Brytne Okuhata EPS, PhD 2022 (committee member)
Diamond Tachera EPS, PhD 2022 (committee member, comprehensive exam committee)
Lucie Knorr Oceanography, PhD current (committee member)
Veronica Gibson Botany, PhD 2022 (committee member, comprehensive exam committee)
Kristina Remple Oceanography, PhD 2021 (committee member)
Tineill Dudoit EPS MS 2020 (committee member)
Jonathan Tobin EPS MS 2020 (committee member)
Jordan Mason GG, MS 2020 (committee member)
Haunani Kane GG, PhD 2019 (committee member)
Christopher Shuler GG, PhD 2019 (committee member, comprehensive exam committee)
Michael Mathioudakis GG, MS 2019 (committee member)
Kariem Ghazal NREM, PhD 2019 (committee member, comprehensive exam committee)
Florybeth LaValle, Marine Biology, PhD 2018 (committee member, comprehensive exam committee)
Joseph Kennedy GG, MS 2018 (committee member)
Kristen Fogaren Oceanography, PhD 2017 (committee member)
Joseph Fackrell GG, PhD 2016 (committee member)
Ken Lewis, GG MGeo 2016 (interim advisor)
James Bishop GG MS, 2016 (committee member)
Jacque Kelly GG, Ph.D. 2012 (committee member, comprehensive exam committee)
Kayla Holleman GG, M.S. 2011 (committee member)
Elaine Lampitoc GG, M.S. B 2010 (committee member)
Kristen A. McReynolds Chemistry, MS (committee member)

UNDERGRADUATE ADVISING (OTHER THAN BS THESIS ADVISOR)

Olivia Schmitt – NSF REU undergraduate research assistant 2022/23
Haley Currier – MTV project undergraduate research assistant 2022/23
Kathy Ho – UROP funded undergraduate research assistant 2022/23
Aston Benjamin Ramos – Earth Science on Volcanic Islands, Research Experience for Undergraduates, project advisor, project advisor, summer 2017

Sofia Suesue - Pacific Islands Climate Adaptation Science Center Summer Fellow, project advisor, summer 2017
Joe Kennedy, Global Environmental Studies, undergraduate co-advisor, B.S. 2011
Samuel Wall – Undergraduate Research and Mentoring in the Biological Sciences Fellow, project advisor, summer 2013
La Noa O Pono Keahinuuanu –Internship Partnership Between Geology & Geophysics and Kokua Puni at the University of Hawaii at Manoa, spring 2013
Jennet Chang – Earth Science on Volcanic Islands, Research Experience for Undergraduates, project advisor, summer 2017
Funded undergraduate interns: Sierra Stammer, Raymond Moore, Vanessza Lopez, Haley Currier, U'ilani Jesse-Kealanahele, Kathy Ho, Montana Duggan

SERVICE

UH Manoa Faculty Senate 2015-2017
UH Manoa Graduate Council – Course Committee & Grievance Committee 2012/2013, 2022
UH Manoa Graduate Council – Administrative-Admissions-Advisory Committee 2013/2014
UH Manoa Academic Grievance Committee - member 2012/2013 and 2013/2014
New Student Orientation Parent & Family Sessions – panelist 2014, 2015, 2016

SOEST service:
Search Advisory Committee: SOEST Biogeochemical Analytical Laboratory Manager
GG rep on SOEST student cohort host committee fall 2014
COSEE Science Advisory Committee – member 2012/2013
SOEST S-lab advisory board member 2018/19
SOEST Research Council member 2018/19
SOEST Academic Council member 2022/23

Department service:
GG Graduate Admissions Committee – member, 2010/11 and 2013/14
GG Honors and Relations Committee – member, 2010/11; chair, 2011/12; member, 2012/13
GG Curriculum Committee – member 2012/13
GG Student Committee – member 2013/14 and Chair 2014/15
GG Ad Hoc Planning Committee - member 2013/14
GG Graduate Studies – 2018/2019
Earth Department Committee – chair 2019/20 and 2020/21
GG/Earth Associate Chair–2015/16 and 2016/17 and 2021/22 and 2022/23
MEG Division Head 2018-2020, 2021/22
Earth and Planetary Sciences graduate program -Graduate Chair 2021/22, 2022/23