

# HENRIETTA DULAI

## PROFESSOR

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### 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

**Chair, Earth and Planetary Sciences Graduate Program** August 2021 - present  
UNIVERSITY OF HAWAI'I, DEP. OF EARTH SCIENCES

**Professor** August 2021 - present

**Associate Professor** August 2014 - 2021

**Assistant Professor** January 2009 – August 2014  
UNIVERSITY OF HAWAI'I, DEP. OF EARTH SCIENCES/GEOLOGY AND GEOPHYSICS

**Affiliate Faculty** January 2012 - present  
UNIVERSITY OF HAWAI'I, 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

### PEER REVIEWED PUBLICATIONS

<sup>x</sup>student advisee \*postdoctoral advisee  
Google scholar: <http://go.hawaii.edu/3bB>  
(note Dulai name change from Dulaiova)

1. Dulai, H., C. Smith, V. Gibson, L. Bremer, D. Amato, 2021. Risk to native marine macroalgae from land-use and climate change related modifications to groundwater discharge in Hawai'i. *Limnology and Oceanography Letters*, in press. [https://doi.org/10.1002/\(ISSN\)2378-2242](https://doi.org/10.1002/(ISSN)2378-2242)
2. McKenzie\*, 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>
3. 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. 2021. A density-dependent multi-species model to assess groundwater flow and nutrient transport in the coastal Keauhou aquifer, Hawai'i, USA. *Journal of Hydrogeology*. <https://doi.org/10.1007/s10040-021-02407-y>

4. Burnett, K., C. Wada, 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
5. McKenzie\*, 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>
6. 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>
7. 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>
8. 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.
9. McKenzie\*, 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>
10. Okuhata\*, 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.
11. 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 O'ahu. *PLoS ONE* 15(7): e0235661. <https://doi.org/10.1371/journal.pone.0235661>
12. 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.
13. 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.
14. McKenzie\*, T., H. Dulai., J. Chang\*, 2019. Parallels between stream and coastal water quality associated with groundwater discharge. *PLOS ONE*, 14(10):e0224513. doi: 10.1371/journal.pone.0224513.
15. Welch\*, 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>.
16. 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.
17. 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>.
18. Ghazal\*, 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.
19. 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.
20. Kelly\*, 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.

21. Ghazal<sup>x</sup>, 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.
22. 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
23. 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).
24. Leta\*, O.T., A. El-Kadi, H. Dulai, 2018. Impact of Climate Change on Daily Streamflow and Its Extreme Values in Pacific Island Watersheds. *Sustainability* 10, 2057; doi:10.3390/su10062057
25. McKenzie<sup>x</sup>, T. and H. Dulai, 2017. Fukushima-derived radiocesium fallout in Hawaiian soils. *Journal of Environmental Radioactivity*. 180, 106-113.
26. Richardson<sup>x</sup>, C., H. Dulai. B. N. Popp, K. Ruttenger, J. K. Fackrell, 2017. Submarine groundwater discharge drives biogeochemistry in two Hawaiian reefs. *Limnology and Oceanography*, 62(S1), S348-S363.
27. Bruno, B. C., J. Engels, G. Apuzen-Ito, J. Gillis-Davis, H. Dulai, G. Carter, C. Fletcher, D. Bottjer-Wilson, 2017. Two-stage exams a powerful tool for reducing the achievement gap in undergraduate oceanography and geology classes, *Oceanography*, 30(2), 198-208.
28. Shuler, C. A. El-Kadi, H. Dulai, C. Glenn, J. Fackrell, 2017. Source partitioning of anthropogenic groundwater nitrogen in a mixed-use landscape, Tutuila, American Samoa. *Hydrogeology Journal*, 25(8), 2419-2434.
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30. Azouz<sup>x</sup>, H. and H. Dulai, 2017. In the wake of Fukushima: Radiocesium inventories in selected North Pacific fish. *Pacific Science*. 71(2), 107-115.
31. Amato, D.W., J. M. Bishop, C. R. Glenn, H. Dulai, C. Smith, 2016. Impact of Submarine Groundwater Discharge on Marine Water Quality and Reef Biota of Maui. *PLOS ONE*, 11(11): e0165825. <https://doi.org/10.1371/journal.pone.0165825>
32. Fackrell, J.K., Glenn, C.R., Popp, B.N., Whittier, R.W., and Dulai, H., 2016. Wastewater injection, biogeochemical reactions, and resultant groundwater N flux to coastal waters: Kā'anapali, Maui, Hawai'i. *Marine Pollution Bulletin* 110, 281-292.
33. Leta\*, O. T., A. El-Kadi, H. Dulai, K. Ghazal, 2016. Assessment of climate change impacts on water balance components of Heeia watershed in Hawaii. *Journal of Hydrology: Regional Studies* 8, 182-197.
34. Phillips, E.H, K.W.W. Sims, D.R.Sherrod, V.J.M. Salters, J. Blusztajn, H. Dulai, 2016. Isotopic constraints on the genesis and evolution of basaltic lavas at Haleakala, Island of Maui, Hawaii. *Geochimica et Cosmochimica Acta*, 195, 201-225.
35. Fröllje, H., K. Pahnke, B. Schnetger, H.-J. Brumsack, H. Dulai, J. N. Fitzsimmons, 2016. Hawaiian imprint on dissolved Nd and Ra isotopes and rare earth elements in the central North Pacific: local survey and seasonal variability. *Geochimica et Cosmochimica Acta*, 189, 110-131.
36. Dulai, H., A. Kleven<sup>x</sup>, K. Ruttenger, R. Briggs, F.I. Thomas, 2016. Evaluation of Submarine Groundwater Discharge as Coastal Nutrient Source and Its Role in Coastal Groundwater Quality and Quantity. A. Fares (ed.), *Emerging Issues in Groundwater Resources, Advances in Water Security*, DOI 10.1007/978-3-319-32008-3\_8
37. Dulai, H., J. Kamenik\*, C.A.Waters<sup>x</sup>, J. Kennedy, J.Babinec, J.Jolly, M.Williamson, 2016. Autonomous long-term gamma-spectrometric monitoring of submarine groundwater discharge trends in Hawaii. *Journal of Radioanalytical and Nuclear Chemistry*. 307: 1865-1870. DOI 10.1007/s10967-015-4580-9
38. Swarzenski, P.W, H. Dulai, K.D. Kroeger, C.G. Smith, N. Dimova, C.D. Storlazzi, N.G. Prouty, S.B. Gingerich, C.R. Glenn, 2016. Observations of nearshore groundwater discharge: Kahekili Beach Park submarine springs, Maui, Hawaii. *Journal of Hydrology: Regional Studies*. 11:147-165.

<https://doi.org/10.1016/j.ejrh.2015.12.056>

39. Richardson<sup>x</sup>, C.M, H. Dulai, R.B. Whittier, 2016. Sources and spatial variability of groundwater-delivered nutrients in Maunaloa Bay, Oahu, Hawai'i. *Journal of Hydrology: Regional Studies* 11: 178-193. <http://dx.doi.org/10.1016/j.ejrh.2015.11.006>
40. Bishop, J.M, C.R. Glenn, D.W. Amato, H. Dulai, 2015. Effect of land use and groundwater flow path on submarine groundwater discharge nutrient flux. *Journal of Hydrology: Regional Studies*. doi:10.1016/j.ejrh.2015.10.008
41. Nelson, C. N., M. J. Donahue, H. Dulaiova, S. J. Goldberg, F. F. La Valle, K. Lubarsky, J. Miyano, C.M. Richardson<sup>x</sup>, N. J. Silbiger and F. I.M. Thomas, 2015. Fluorescent dissolved organic matter as a multivariate biogeochemical tracer of submarine groundwater discharge in coral reef ecosystems. *Marine Chemistry*. 177, 2 (20), 232-243.
42. Ganguli, P., P.W. Swarzenski, H. Dulaiova, C.R. Glenn, A.R. Flegal, 2014. Mercury dynamics in a coastal aquifer: Maunaloa Bay, Oahu, Hawaii. *Estuarine, Coastal and Shelf Science*, 140, 52-65.
43. Dudley, B.D., R.A. MacKenzie, T.S. Sakihara, H. Dulaiova, C.A. Waters<sup>x</sup>, R.F. Hughes and R. Ostertag, 2014. Influences of native and non-native vegetation and invasive fish on water chemistry of Hawaiian anchialine ponds. *Pacific Science*, 68(4).
44. Kamenik<sup>\*</sup>, J., H. Dulaiova, K. O. Buesseler, S. M. Pike, and K. Stastna<sup>x</sup>, 2013. Cesium-134 and 137 activities in the central North Pacific Ocean after the Fukushima Dai-ichi nuclear power plant accident, *Biogeosciences*, 10, 6045-6042.
45. Swarzenski, P., H. Dulaiova, M. L. Dailer, C. R. Glenn, C. G. Smith, C.D. Storlazzi, 2013. A Geochemical and Geophysical Assessment of Coastal Groundwater Discharge at select sites in Maui and O'ahu, Hawai'i, In: *Groundwater in the Coastal Zones of Asia Pacific*, Ed: C. Wetzelhuetter, Coastal Research Library, Vol. 7, 339.
46. Simms, K. W. W., Pichat, M. K. Reagan, P. R. Kyle, H. Dulaiova, N. Dunbar, J. Prytulak, G. Sawyer, G. Layne, J. Blichert-Toft, P.J.Gauthier, M.A. Charrette, T. R. Elliott, 2013. On the timescales of magma genesis, melt evolution, crystal growth rates and magma degassing in the Erebus volcano magmatic system using the 238U-, 235U- and 232Th-decay series, *Journal of Petrology*, 54(2), 235-271.
47. Dulaiova, H., K. W. W. Simms, J. Prytulak, M. A. Charette, 2013. New method for actinium separation in geological samples. *Journal of Radioanalytical and Nuclear Chemistry*, 296(1), 279-283.
48. Kamenik<sup>\*</sup>, J., H. Dulaiova, F. Sebesta, and K. Stastna<sup>x</sup>, 2013. Fast concentration of dissolved forms of cesium radioisotopes from large seawater samples, *Journal of Radioanalytical and Nuclear Chemistry*, 296(2), 841-846.
49. Pike, S. M., K.O. Buesseler, C.F. Breier, H. Dulaiova, K. Stastna<sup>x</sup>, F. Sebesta, 2013. Extraction of cesium in seawater off Japan using AMP-PAN resin and quantification via gamma spectroscopy and inductively coupled mass spectrometry, *Journal of Radioanalytical and Nuclear Chemistry*, 296(1), 369-374.
50. Charette, M. A., H. Dulaiova, M.E. Gonneea, P.B. Henderson, W.S. Moore, J.C. Scholten, M.K. Pham, 2012. GEOTRACES radium isotopes interlaboratory comparison experiment, *Limnol. Oceanogr.: Methods* 10, 451-463.
51. Dimova, N. T., P.W. Swarzenski, H. Dulaiova, C. R. Glenn, 2012. Utilizing multichannel electrical resistivity methods to examine the dynamics of the fresh water-seawater interface in two Hawaiian groundwater systems, *Journal of Geophysical Research* 117 (C2), C02012.
52. Peterson, R.N., C.R. Glenn, H. Dulaiova, and T. Stieglitz, 2010. Emerging Issues Seminar: Exploring the formation of a working group to examine the subterranean estuary. *Limnology and Oceanography Bulletin*, 19(3), 69.
53. Scholten, J. C., M. K. Pham, O. Blinova, M. A. Charette, H. Dulaiova, and M. Eriksson, 2010. Preparation of Mn-fiber standards for the efficiency calibration of the delayed coincidence counting system (RaDeCC). *Marine Chemistry*, 121(1-4), 206-214. doi: 10.1016/j.marchem.2010.04.009.
54. Dulaiova, H., Camilli, R., P. B. Henderson, and M. A. Charette, 2010. Coupled Radon, Methane And Nitrate Sensors For Large-Scale Assessment Of Groundwater Discharge And Non-Point Source

- Pollution To Coastal Waters, *Journal of Environmental Radioactivity*, 101(7), pp. 553-563, doi: 10.1016/j.jenvrad.2009.12.004.
55. Ardelan, M. V., O Holm-Hansen, C. D. Hewes, C. S. Reiss, N. S. Silva, H. Dulaiova, E. Steinnes, and E. Sakshaug, 2010. Natural iron enrichment around the Antarctic Peninsula in the Southern Ocean. *Biogeosciences*, 7, 11-25, doi:10.5194/bg-7-11-2010.
  56. Dulaiova, H., M. V. Ardelan, P. B. Henderson, and M. A. Charette, 2009. Shelf-derived iron inputs drive biological productivity in the Southern Drake Passage. *Global Biogeochemical Cycles*, 23, GB4014, doi:10.1029/2008GB003406.
  57. Pike, S. M., H. Dulaiova, K. O. Buesseler, 2009. Assessment of size-fractionated species of curium-244 via alpha-spectrometry in groundwater, *Journal of Radioanalytical and Nuclear Chemistry*, doi: 10.1007/s10967-009-0214-4.
  58. Dulaiova, H., Gonnee, M. E., P. B. Henderson, and M. A. Charette, 2008. Geochemical and physical sources of radon variation in a subterranean estuary - Implications for radon groundwater end-member activities in submarine groundwater discharge studies, *Marine Chemistry*, 110(1-2), 120-127.
  59. Dulaiova, H. and W. C. Burnett, 2008. Evaluation of the flushing rates of Apalachicola Bay, Florida via natural geochemical tracers, *Marine Chemistry*, 109(3-4), 395-408.
  60. Gonnee, M. E., P. J. Morris, H. Dulaiova, and M. A. Charette, 2008. New perspectives on radium behavior within a subterranean estuary, *Marine Chemistry*, 109(3-4), 250-267.
  61. Garcia-Solsona, E., J. Garcia-Orellana, P. Masqué, and H. Dulaiova, 2008. Uncertainties associated with  $^{223}\text{Ra}$  and  $^{224}\text{Ra}$  measurements in water via a Delayed Coincidence Counter (RaDeCC), *Marine Chemistry*, 109(3-4), 198-219.
  62. Dimova, N, H. Dulaiova, G. Kim, and W. C. Burnett, 2008. Uncertainties in the preparation of  $^{224}\text{Ra}$  Mn fiber standards. *Marine Chemistry*, 109(3-4), 220-225.
  63. Taniguchi, M., W. C. Burnett, H. Dulaiova, F. Siringan, J. Foronda, G. Wattayakorn, S. Rungsupa, E. A. Kontar, and T. Ishitobi, 2008. Groundwater discharge as an important land-sea pathway into Manila Bay, Philippines, *Journal of Coastal Research*, 24(1A).
  64. Burnett, W. C., N. Dimova, H. Dulaiova, D. Lane-Smith, B. Parsa, and Z. Szabo, 2007. Measuring thoron ( $^{220}\text{Rn}$ ) in natural waters. Book chapter in "Environmental Radiochemical Analysis III" (ed. P. Warwick), Royal Society of Chemistry, RSC Publishing, Cambridge, 24-37.
  65. Burnett, W. C., G. Wattayakorn, M. Taniguchi, H. Dulaiova, P. Sojisuporn, S. Rungsupa, T. Ishitobi, 2007. Groundwater derived nutrient inputs to the Upper Gulf of Thailand, *Continental Shelf Research*, 2(15), 176-190.
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  70. Dulaiova, H., W. C. Burnett, J. P. Chanton, W. S. Moore, H. J. Bokuniewicz, M. A. Charette, and E. Sholkovitz, 2006. Assessment of Submarine Groundwater Discharges into West Neck Bay, New York, via Natural Tracers, *Continental Shelf Research*, 26(16), 1971-1983.
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#### **PUBLICATIONS (NON-PEER REVIEWED)**

80. 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.
81. 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>.
82. Dulai, H. 2016. Submarine Groundwater Discharge. *Ka Pili Kai*, 38(1). p.6.
83. Moran S.B. and H. Dulaiova, 2013. Radium and radon tracers in aquatic systems: An update. *Marine Chemistry, Special Issue editorial*, 156C.
84. Glenn, C.G., R.B. Whittier, M.L. Dailer, H. Dulaiova, A. I. El-Kadi, J. Fackrell, J.L. Kelly, C.A. Waters<sup>x</sup>, and J. Sevadjian, 2013. Lahaina groundwater tracer study – Lahaina, Maui, Hawaii. Final Report prepared for the State of Hawaii Department of Health, US EPA and US Army Engineer Research and Development Center. 502 pp.
85. Glenn, C.G., R.B. Whittier, M.L. Dailer, H. Dulaiova, A. I. El-Kadi, J. Fackrell, J.L. Kelly, and C.A. Waters<sup>x</sup>, 2012. Lahaina groundwater tracer study – Lahaina, Maui, Hawaii. Final Interim Report prepared for the State of Hawaii Department of Health, US EPA and US Army Engineer Research and Development Center. 463 pp.
86. Beck, A. J., H. Dulaiova, J. K. Cochran, 2010. Journal of Environmental Radioactivity special issue: Radium and Radon Isotopes as Environmental Tracers, Editorial, *Journal of Environmental Radioactivity*, 101(7), 519-520, doi: 10.1016/j.jenvrad.2010.04.013
87. Dulaiova, H., 2006. Identifying coastal pollution from submarine groundwater discharge. 2006 *Coastal Ocean Institute Annual Report*, Woods Hole Oceanographic Institution.
88. Swarzenski, P., W. C. Burnett, C. Reich, H. Dulaiova, R. Peterson, and J. Meunier, 2004. Novel Geophysical and Geochemical Techniques Used to Study Submarine Groundwater Discharge in Biscayne Bay, Florida, *USGS Fact Sheet* 2004-3117.

## GRANTS

1. 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.
2. 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.
3. NSF EPIK: Project EPIK - Earth, Planets, Ike, and Kuleana - Preparing the next generation of diverse geoscientists in Hawai'i. PI: B. Smith-Konter, co-PIs: H. Dulai, J Engels, J. Konter, S. Rowland. Funding period: August 1, 2019- July 31, 2022.
4. 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.
5. County of Kauai: Hydrological Investigation at Kaua'i Salt Pond, PI: R. Papp, co-PIs: H. Dulai, A. El-Kadi, N. Grobbe, N.Lautze. Funding period: March 1, 2019-October 31, 2020.
6. 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.
7. NSF ASPIRE: Groundwater sustainability for small farmers of O'ahu. PI: J. Engels, water quality lead H. Dulai. Funding Period: May 1, 2018-April 30, 2019.
8. 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.
9. 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.
10. USGS WRRC: Stream pesticide and nutrient loads from baseflow, surface runoff, and sediment contributions on Tutuila Island, American Samoa. PI: H. Dulai. Funding period: March 1, 2016-February 29, 2018.
11. UH Sea Grant (NOAA): The role of surface and groundwater inputs in driving water quality in Kane'ohē Bay, Oahu. PI: H. Dulai. Funding period: March 1, 2016-February 29, 2018.
12. USGS WRRC: Geochemical Delineation of Aquifer Boundaries and Assessment of Groundwater Quality on Tutuila Island, American Samoa. PI: H. Dulaiova. Funding period: March 1, 2015-February 29, 2016.
13. USGS WRRC: Quantifying Groundwater Discharge from the Faga'alu Aquifer, American Samoa. PI: H. Dulaiova. Funding period: March 1, 2014-February 28, 2015.
14. UH Sea Grant (NOAA): Groundwater-Derived Nutrient Uptake in Coastal Ecosystems as a Driver of Shifts in the Accretion-Erosion Balance. PI: H. Dulaiova, co-PI: P. Fuleky. Funding period: Feb 2014 – Jan 2016.
15. UH Sea Grant (NOAA): Quantifying Transport and Land-Use Impacts of Groundwater and Nutrient Loadings to the Coastal Zones of Maui. PI: C.R. Glenn, co-PIs: H. Dulaiova, A. El-Kadi, J. Kelly. Funding period: Feb 2014 – Jan 2016.
16. USGS: Assessing Ground Water Sustainability of the Island of Tutuila, American Samoa. PI: El-Kadi, co-PIs: C.R. Glenn, and H. Dulaiova, Funding Period: March 2013 - Feb 2014.
17. UH Sea Grant (NOAA): Collaborative Research to Develop Sustainable Ecosystem Management: Analysis of Water Resources and Quality in the Contemporary Ahupua'a. PI: H. Dulaiova co-PI: A. El-Kadi. Funding period: Feb 2012 – Jan 2014.
18. UH Sea Grant (NOAA): Connecting Land-Use to Submarine Groundwater Discharge Loads and Coral Reef Health within the Coastal Zones of Maui. PI: C.R. Glenn, co-PIs: H. Dulaiova, B. Popp, and C. Smith. Funding period: Feb 2012 – Jan 2014.
19. DOH and Army Corps of Engineering: Lahaina Groundwater Tracer Study, Lahaina, Maui, Hawaii, PI: C. Glenn co-PIs: H. Dulaiova and A. El-Kadi, Funding Period: May 2011 - Jun 2013.
20. NSF RAPID: Establishing radionuclide levels in the central Pacific Ocean in response to releases from the Fukushima Daiichi nuclear power plant, PI: H. Dulaiova, Funding Period: May 2011 - Oct 2012.

21. Moore Foundation WHOI sub-award to UH: Establishing radionuclide levels in coastal Japan and the western Pacific Ocean in response to releases from the Fukushima Daiichi nuclear power plant. PI: H. Dulaiova, Project dates: May 2011 - Apr 2012.
22. State of Hawaii funded ship-time on R/V Kilo Moana: Rare earth elements, neodymium and radium isotopic composition of seawater used for source tracking of island derived components, PIs: H. Dulaiova and K. Pahnke, Feb 2011, 2-day ship time.
23. NIST: Radionuclide Measurement Assurance for Radiobioassay, PI: H. Dulaiova, Funding period: Sep 2010-Aug 2013.
24. NSF EPSCoR: EMUA III: Pacific High Island Evolutionary Biogeography: Impacts of Invasive Species, Anthropogenic Activity and Climate Change on Hawaiian Focal Species. Total Award (J. Gaines PI). UHM ENDER Marine: C. Glenn (co-PI), H. Dulaiova (faculty participant). Funding period: Sep 2009 – Aug 2014.
25. UH Sea Grant (NOAA): Quantifying fluxes and dissolved loads of submarine groundwaters to Oahu's coastal zone. PI: C. R. Glenn, co-PIs: P. G. Lucey, and H. Dulaiova. Funding period: Feb 2009 – Jan 2012.
26. NSF OCE: Sources of Iron to the Eastern Tropical Atlantic: Does the Continental Margin Supplement Saharan Dust? PI: P. J. Lam, co-PIs: H. Dulaiova and K. O. Buesseler. Funding period: Sep 2007 – Aug 2010.
27. MIT Sea Grant (NOAA): Development of a Radon/Nitrate mapping system for a large-scale assessment of submarine groundwater discharge and non-point source pollution to coastal waters. PIs: H. Dulaiova and M. A. Charette, Funding period: Mar 2007 – Feb 2009.
28. NSF OCE-CO: Collaborative Research: GEOTRACES: Intercalibration Exercise for Radium Isotopes in Seawater. PI: M. A. Charette, co-PIs: W. S. Moore, H. Dulaiova, Funding period: Mar 2008 – Feb 2010.
29. WHOI Coastal Ocean Institute: Development of a Radon/Methane/Nitrate mapping system for a large-scale assessment of submarine groundwater discharge and non-point source pollution in the coastal zone. PI: H. Dulaiova, co-PIs: M. Charette, and R. Camilli, Funding period: Jun 2006 – May 2008.
30. NOAA National Estuarine Research Reserve System Graduate Research Fellowship: Evaluation of Flushing Rates of Estuaries and Embayments via Natural Geochemical Tracers. H. Dulaiova w/ advisor W. C. Burnett, Funding period: Jun 2003 – May 2005.

## **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 in Environmental Science, section 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.



**CONFERENCE SESSION CONVENER:**

2022: ASLO Ocean Sciences Meeting Honolulu HI, Session CB02: Submarine groundwater discharge – a global phenomenon with local effects.

2021: International Tropical Islands Water Conference, Honolulu HI, Session on submarine groundwater discharge and groundwater dependent ecosystems.

2018: European Geosciences Union General Assembly 2018, Vienna, Austria. Session Convener: HS8.2.10 Submarine groundwater discharge as a driver of biogeochemistry at the land-sea interface

2017: GSA Cordilleran Section 113<sup>th</sup> Annual Meeting, Honolulu, HI, Technical Program Chair, Poster Program Chair, session convener: T29 – Coastal Hydrology: Impacts of Natural and Anthropogenic Change.

2017: 61<sup>st</sup> Radiobioassay and Radiochemical Measurements Conference, Honolulu, HI, Chair of Technical Program, Organizing Committee

2017: ASLO Aquatic Sciences meeting: Mountains to the Sea, Honolulu, HI, session convener: 65 – Groundwater-surface water interactions across the terrestrial-marine continuum

2015: 2nd Water Resource Sustainability Issues on Tropical Islands Conference. Honolulu, HI, session convener.

2015: MARC X: Tenth International Conference on Methods and Applications of Radioanalytical Chemistry; session convener: Methods and Applications of Radium and Radon Isotopes in the Environmental Sciences

2014: Ocean Sciences Meeting, session convener: 60 - Submarine Groundwater Discharge - from Ridge to Reef: Groundwater Evolution, Climate, Land-Use, Coastal Hydrology and Marine Biogeochemical Impacts

2013: 59<sup>th</sup> Radiobioassay and Radiochemical Measurements Conference, Rohnet Park, CA, Chair of Technical Session 1: Emergency Response

2012: 4<sup>th</sup> International Ra and Rn workshop, University of Rhode Island, GSO, workshop organizer and session convener: Ra and Rn as tracers of Submarine Groundwater Discharge

2011: Goldschmidt Conference, session convener: 21e - Fluid and solute fluxes across the land, river, lake and ocean interfaces

2010: ASLO summer meeting, Aquatic Sciences: Global changes from the center to the edge – session convener, Session S36 and Interactive session I08 Submarine Groundwater Discharge – From Watershed to Coast: Climate, Land-Use, Geohydrology and Marine Biogeochemical Impacts

**CONFERENCE PRESENTATIONS (FIRST-AUTHORED ONLY):**

1. ASLO Ocean Sciences Meeting Honolulu HI, 2022. Dulai, H., C. Smith, V. Gibson, L. Bremer, D. Amato: Risk to native marine macroalgae from land-use and climate change related modifications to groundwater discharge in Hawai'i.
2. International Tropical Islands Water Conference, Honolulu HI, 2021. H. Dulai, C. Hudson, S. Watson, T. McKenzie, B. Okuhata, D. Tachera, A. El-Kadi. Geochemical signatures of coastal groundwater reflect groundwater flow lines and land-uses in West Hawai'i.
3. Fukushima Dai-ichi and the ocean: 10 years of study and insight, virtual panel, 2021. H. Dulai. Cesium isotope monitoring in the Central Pacific and the Hawaiian Islands.
4. Hawai'i Conservation Conference, Ola Ka 'Āina Momona: Managing for Abundance, 2020. H. Dulai, C. Hudson, T. McKenzie, B. Okuhata, D. Tachera, A. El-Kadi. The sources, composition, and coastal effects of submarine groundwater discharge in West Hawai'i.
5. Consortium for Monitoring, Technology, Verification Kickoff Meeting, Ann Arbor, MI, 2019. H. Dulai. Radionuclides in biota in coastal environments.
6. Consortium for Monitoring, Technology, Verification Bio-sensing Group Kickoff Meeting, Georgia Tech, 2019. H. Dulai. Radionuclides in biota in terrestrial and coastal environments.
7. 6th Ra-Rn Meeting: Radium and radon isotopes as environmental tracers, Delmenhorst, Germany, 2018. H. Dulai. Temporal characteristics of a multi-year record of submarine groundwater discharge in West Hawaii.
8. European Geosciences Union General Assembly, Vienna, Austria, 2018. H. Dulai, P. Fuleky. Time

- series analysis of a multi-year submarine groundwater discharge record from the Kona coast of Hawai'i.
9. Geological Society of America Cordilleran Section 113th Annual Meeting, Honolulu, HI, 2017. H. Dulai. Submarine groundwater discharge on the Hawaiian Islands.
  10. 61st Radiobioassay and Radiochemical Measurements Conference, Honolulu, HI, 2017. H. Dulai, J. Kamenik, J. Jolly, J. Babinec, M. Williamson. Autonomous gamma-spectrometry for monitoring coastal water bodies.
  11. ASLO Aquatic Sciences meeting: Mountains to the Sea, Honolulu, HI, 2017. H. Dulai: SGD distribution on the Hawaiian Islands – spatial and long-term trends and their biogeochemical implications.
  12. 5th Ra-Rn Meeting: Radium and radon isotopes as environmental tracers, Girona, Spain, July 2016. Dulai, H. Radon based SGD budgets of the Hawaiian Islands – spatial and long-term SGD trends and their biogeochemical implications.
  13. 2nd Water Resource Sustainability Issues on Tropical Islands Conference. Honolulu, HI, December 2015. Dulai, H., A. Kleven<sup>x</sup>, K. C. Ruttenberg, R. A. Briggs, and F. I.M. Thomas. Submarine Groundwater Discharge and Corresponding Nutrient Fluxes in Kaneohe Bay, Oahu.
  14. MARC X: International Conference on Methods and Applications of Radioanalytical Chemistry, Kailua Kona, HI April 2015. H. Dulaiova, J. Kamenik, C. A. Waters, J. Babinec, J. Jolly, and M. Williamson: Autonomous long-term gamma-spectrometric monitoring of submarine groundwater discharge in Hawai'i.
  15. ASLO Ocean Sciences Meeting, Honolulu HI, Feb 2014. H. Dulaiova, P. Fuleky, C. Berg, W. Okubo: Acidification rates in Hawaiian coastal waters.
  16. 18th Annual Congressional Science Fair, Coalition for National Science Funding exhibition and reception on Capitol Hill, Washington DC, May 2012. H. Dulaiova: Radionuclide levels in the central Pacific Ocean after the Fukushima Dai-ichi Nuclear power plant accident.
  17. AGU Fall 2013 Meeting, San Francisco, CA, December 2013. H. Dulaiova, A. El-Kadi, Taz Beyene and Kariem Ghazal: Submarine groundwater discharge – a crucial part of hydrology that connects the ridge and reef.
  18. 59<sup>th</sup> Radiobioassay and Radiochemical Measurements Conference, Rohnet Park, CA, October 2013. H. Dulaiova, J. Kamenik, L. N. O Pono Keahinuuanu, F. Sebesta: Environmental cesium levels in Hawaii following the Fukushima Dai-ichi nuclear power plant accident.
  19. JAEN meeting: The Problem of Flotsam from the Great East Japan Earthquake-Tsunami Disaster, Honolulu, HI, January 2013. H. Dulaiova, J. Kamenik, K. Stastna: Radioactivity of water in the tsunami debris field after the March 11, 2011 tsunami and Fukushima Dai-ichi nuclear power plant accident. Invited Speaker
  20. 4<sup>th</sup> International Ra-Rn Workshop, Narragansett, RI USA, June 2012. H. Dulaiova: Radium isotopes as tracers of lateral fluxes off the continental margin of northwest Africa.
  21. MARC IX: International Conference on Methods and Applications of Radioanalytical Chemistry, March 2012. H. Dulaiova: A new method for the determination of low-level actinium in geological samples.
  22. 2012 Ocean Sciences Meeting, Salt Lake City, UT USA, February 2012. H. Dulaiova, J. Kamenik, K. Stastna: Radionuclide levels in the central Pacific Ocean after the Fukushima Dai-ichi Nuclear power plant accident. Poster.
  23. 2012 Fukushima Workshop, Salt Lake City, UT USA, February 2012. H. Dulaiova, J. Kamenik, K. Stastna: Radionuclide levels in the central Pacific Ocean after the Fukushima Dai-ichi Nuclear power plant accident. Invited Speaker
  24. 2010 ASLO-NABS, Aquatic Sciences: Global changes from the center to the edge, Santa Fe, NM, USA, June 2010. H. Dulaiova, M. E. Gonnee, P. Henderson, and M. Charette: Large-scale assessment of SGD from radon surveys.
  25. 3<sup>rd</sup> Ra-Rn Meeting: Radium and radon isotopes as environmental tracers, Jerusalem, Israel, March 2010. H. Dulaiova: Assessment of SGD from large-scale radon survey in a bay with variable groundwater radon activities.

26. Geological Society of America 2008 joint annual meeting, Houston, TX, USA, October 2008. H. Dulaiova, C. Ruppel, E. Chung, M. Gonnee, P. Henderson, M. Charette: Pore water exchange and trace metal fluxes in a New England salt marsh.
27. Invited Speaker
28. 2<sup>nd</sup> Ra-Rn workshop: Measurement and application of radium and radon isotopes in environmental sciences, Venice, Italy, April 2008. H. Dulaiova, M. E. Gonnee, P. Henderson, and M. Charette: Geochemical and physical sources of radon variation in a subterranean estuary. *Poster*.
29. Ocean Sciences Meeting, Orlando, FL, USA, March 2008. H. Dulaiova, E. Chung, M. E. Gonnee, P. Henderson, C. Ruppel, and M. Charette: Multitudinal pathways of groundwater advection and associated nutrient fluxes in salt marsh estuaries.
30. Estuarine Research Federation Meeting, Providence, RI, USA, November 2007. H. Dulaiova: Groundwater Seepage from Subterranean to Surface Estuaries – Examples from Geochemical Tracer Surveys. Invited Speaker
31. ASLO 2007 Aquatic Sciences Meeting, Santa Fe, NM, USA, February 2007. H. Dulaiova, M. Charette, G. B. Mitchell, C. Measures, P. Henderson, R. Supcharoen, and D. Biller: Natural iron fertilization in the Southern Ocean: Investigating horizontal iron transport and vertical carbon flux using radium isotopes and Thorium-234.
32. 52<sup>nd</sup> Annual Radiobioassay & Radiochemical Measurements Conference, Chicago, IL, USA, October 2006. H. Dulaiova and A. Sanchez Ribalta: Radon and thoron measurement in water using a novel membrane contactor and radon-in-air monitor
33. 1<sup>st</sup> Workshop on measurements of short-lived Radium isotopes using the RaDeCC delayed coincidence system, Monaco, October 2006. H. Dulaiova: Utility of <sup>224</sup>Ra, <sup>223</sup>Ra and <sup>222</sup>Rn to characterize pore water exchange in salt marshes
34. Gordon Research Conference: Permeable Sediments, Colby College, ME, USA, June 2006. H. Dulaiova, W. C. Burnett, G. Wattayakorn, and P. Sojisuporn: Are Groundwater Inputs into River-Dominated Areas Important? *Poster*.
35. 51<sup>st</sup> Annual Radiobioassay & Radiochemical Measurements Conference, Stateline, NV, USA, October 2005. H. Dulaiova: The Advantage of the Use of Low Background Gamma-spectrometry for Counting <sup>226</sup>Ra and <sup>228</sup>Ra in Natural Waters
36. 50<sup>th</sup> Annual Conference on Bioassay, Analytical and Environmental Radiochemistry, Cincinnati, OH, USA, November 2004. H. Dulaiova, W. C. Burnett, and N. Dimova: High Concentrations of Radon and Thoron Discovered in Public Water Supplies
37. 49<sup>th</sup> Annual Radiobioassay & Radiochemical Measurements Conference, Jackson, WY, USA, October 2003. H. Dulaiova and W. C. Burnett: Determination of Radium Isotopes in Natural Waters using MnO<sub>2</sub>-Coated Fiber and Gamma Spectrometry
38. Sixth International Symposium & Exhibition on Environmental Contamination in Central & Eastern Europe and the Commonwealth of Independent States, Prague, Czech Republic, September 2003. H. Dulaiova and W. C. Burnett: Evaluation of Water Residence Times in Embayments via Natural Radium Isotopes. *Poster*.
39. 2003 IUGG General Assembly, Sapporo, Japan, July 2003. H. Dulaiova, W. C. Burnett, W. S. Moore and H. Bokuniewicz: Groundwater Discharge and Mixing Estimates in West Neck Bay, Shelter Island, NY via Isotopic Approaches. AGU Student Travel Grant and IUGG Travel Grant recipient
40. 48th Radiobioassay & Radiochemical Measurements Conference, Knoxville, TN, USA, November 2002. H. Dulaiova, D. Lane-Smith, R. Peterson and W. C. Burnett: Improved Continuous Radon Measurements for Coastal Waters.
41. 14th Radiochemical Conference, Marianske Lazne, Czech Republic, April 2002. H. Dulaiova, W. C. Burnett: Improved Measurement of Radium Isotopes at Low Concentrations in Natural Waters
42. 47th Annual Radiochemical Measurements Conference, Honolulu, HI, USA, November 2001. H. Dulaiova, G. Kim, W. C. Burnett: Measurement of <sup>224</sup>Ra and <sup>226</sup>Ra Activities in Natural Waters Using a Radon-in-Air Monitor
43. Eichrom Technologies, Inc. North American Users` Group Workshop, Knoxville, TN, USA, May 2001. H. Dulaiova, G. Kim, W. C. Burnett, E. P. Horwitz: Analysis of Actinide Elements from Large Samples
44. IRPA Congress on Radiation Protection in Central Europe, Budapest, Hungary, August 1999. H. Dulaiova, V. Beckova, I. Bucina: Determination of Americium by Extraction Chromatography in Urine

Samples. Poster.

45. 13th National Seminar About Separation Chemistry, Lazne Bohdanec, Czech Republic, June 1999. H. Dulaiova: Review of Methods for the Determination of  $^{241}\text{Am}$  in Excretion Analysis

#### **PROFESSIONAL AFFILIATIONS**

American Geophysical Union

American Society of Limnology and Oceanography

#### **OUTREACH**

Voice of the Sea episodes (1 won bronze and 1 silver Telly award):

<https://seagrant.soest.hawaii.edu/testing-freshwater/>

<https://seagrant.soest.hawaii.edu/mapping-the-freshwater-of-hawaii/>

<https://seagrant.soest.hawaii.edu/cesspool-issues-rising/>.

Some examples of interviews, articles, and podcasts:

<https://www.hawaiipublicradio.org/local-news/2021-12-16/rising-sea-levels-could-mean-less-freshwater-for-hawaii>

<https://www.sciencedaily.com/releases/2021/12/211208165156.htm>

<https://schmidtocean.org/cruise-log-post/the-ocean-is-radioactive/>

<https://bytemarkscfe.org/2016/12/14/episode-433-maui-groundwater-study-dec-14-2016/>

<https://www.science.org/content/article/scotus-clean-water>

<https://www.youtube.com/watch?v=oeyvsTU4d0w>

<https://www.hawaii.edu/news/2019/02/28/manoa-researchers-nuclear-nonproliferation-education/>