# Kaho H. Tisthammer, Ph.D.

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## EDUCATION

**University of Hawaii at Manoa**, Ph.D. in Marine Biology

**University of California, Santa Barbara**, Graduate program in Environmental Science & Management

**State University of New York at Stony Brook**, Masters in Applied Ecology

**International Christian University**, Tokyo, Japan, Bachelor in Biology, Division of Natural Science

## PROFESSIONAL EXPERIENCE

**Postdoctoral Researcher**, *University of California, Davis,* 2022 - Current

- Conducted population and evolutionary genomic analysis of Pacific herring
- Examined the cause of a population crush of Pacific herring in the Prince William Sound, Alaska since the Exxon Valdez oil spill using the temporal genomic data
- Evaluated spatial population structure of Pacific herring from California to Alaska

**Postdoctoral Researcher/Adjunct Professor/Lecturer**, *San Francisco State Univ.,* 2018 - 2021

- Established custom bioinformatics analysis pipelines to analyze raw viral NGS data for assessing evolutionary dynamics
- Created a genome-wide map of fitness costs of individual mutations in HCV using R & Python
- Applied a random forest regression model to decipher the determinants of fitness costs
- Assessed *In vivo* selective sweep and diversity changes in SIV from Mtb co-infected Macaques
- Mentored 10 undergraduate and 11 graduates students

**Health Data Science Fellow**, Insight, San Francisco, Jan-Mar, 2020

- Built a predictive tool to estimate the risk of hospital acquired infections for ICU patients, allowing healthcare providers to prioritize patients and take precautionary measures
- Developed a ML based classification model in Python, using RF to achieve an ROC score 0.82
- Created a web based interactive tool to using Flask in Python and AWS

**Postdoctoral Researcher**, *Kewalo Marine Laboratory, University of Hawaii at Manoa,* 2017 - 2018

- Pioneered the new protocol to conduct shotgun proteomics in corals
- Showed impacts of pollutants/toxicants on marine organisms using proteomics and genomics
- Developed molecular biomarkers for land-based pollutant exposure in corals

**Graduate Research Assistant**, *Kewalo Marine Laboratory, University of Hawaii at Manoa,* 2013 - 2017

- Investigated the sub-lethal (molecular) effects of chemical pollutants on corals
- Revealed the effects of genetics on stress response differences in corals

## Earlier Experiences

**Financial Advisor** | Merrill Lynch, Edward Jones, Honolulu, HI

**Business Owner** | Kona Gold Rum Co. LLC., Captain Cook, HI

## Other Relevant Research Experiences

**Ph.D. Dissertation Research,** Understanding the adaptive ability of corals to rapidly changing environments

- Revealed local adaptation of lobe coral to the nearshore habitats using genetics, proteomics, and physiology with field and laboratory experiments
- Assessed the 'complex' evolutionary relationships of *Porites* species using phylogenomics
- Quantitatively assessed corallite morphological characters in *Porites*

**Effects of Watersheds on Coral Reefs in West Maui**

- Assessed the effects of watersheds on coral communities in West Maui
- Funded by the National Fish and Wildlife Foundation and Maui Nui Marine Resource Council

**Ecological Assessment of Okinawa's Coral Reefs**

- Independently organized and carried out ecological rapid assessments of coral reefs in Okinawa
- Funded by a grant through the World Wildlife Fund, Japan

**Impact of Scuba Diving on Coral Communities**

- Independently planned and conducted a field research project to assess the effects of scuba diving on coral communities in the Cayman Islands, B.W.I.
- Funded by a grant through the Marine Educational Research Institute (MERI)

**Atlantic & Gulf Rapid Reef Assessment (AGRRA)**

- Conducted coral reef assessments as part of the AGRRA team in the Cayman Islands and the Turks and Caicos Islands (> 40 different sites)
- Performed data management, statistical analysis, and generated reports for the team

**Master's Thesis Research**, Ecological and sociological assessment of local endemic bamboo use in Ranomafana National Park, Madagascar

**Senior Thesis Research**, Uncovering the function of the madreporite in the sea urchin

## Teaching Experiences

**Instructor,** San Francisco State University, Marine Ecology -1 semester, Marine Ecology Laboratory - 1 semester, Coding Community - 1 semester

**Co-instructor**, San Francisco State University, Bioinformatics, 2 semesters

**Guest Lecturer,** University of Hawaii at Manoa, Science Communication, 1 semester

**Teaching Assistant**

- University of Hawaii at Manoa, graduate-level Marine Biology, 1 semester
- University of California, Santa Barbara, Population Ecology, Vertebrate Morphology, 1 semester each
- Stony Brook University, Field Ecological Lab, Intro Biology, 1 semester each

**Instructor/Organizer,** Summer Ocean Field Program by Coral Network Hawaii (a non-profit educational organization established by myself and funded by a grant), 1 summer

## Teaching Related Training

**GOLD (Graduate Opportunities to Learn Data science) Teaching Square**, San Francisco State University, Fall 2021

**Justice, Equity, Diversity, & Inclusion Pedagogies of Inclusive Excellence Institute Course,** San Francisco State University, Spring 2021

**Quality Learning and Teaching -Online Teaching Lab** by the Center for Equity & Excellence in Teaching & Learning at San Francisco State University, Fall 2020

## PUBLICATIONS & SELECT PRESETATIONS

### PUBLICATIONS

- Tisthammer KH, Solis C†, Orcales F†, Nzerem M†, Winstead R†, Dong W, Joy JB, Pennings PS. 2022. Assessing *in vivo* mutation frequencies and creating a high-resolution genome-wide map of fitness costs of Hepatitis C virus. PLOS Genetics.18(5): e1010179 https://doi.org/10.1371/journal.pgen.1010179
- Tisthammer KH, Kline C, Rutledge T, Ita S, Johnson WE, Lin PL, Ambrose Z, Pennings PS. 2022. SIV evolutionary dynamics in cynomolgus macaques during SIV-Mycobacterium tuberculosis co-infection. Viruses 14, 48 https://doi.org/10.3390/v14010048
- Tisthammer KH, Timmins-Schiffman, E, Seneca FO, Nunn BL, Richmond RH. 2021. Physiological and molecular responses of lobe coral indicate nearshore adaptations to anthropogenic stressors. Scientific Reports 11:3423 https://doi.org/10.1038/s41598-021-82569-7
- Tisthammer KH, Dong W, Joy JB, Pennings PS. 2021. Comparative analysis of *in vivo* mutation patterns and diversity of Hepatitis C Virus subtypes 1a, 1b, and 3a. Viruses 13, 511 https://doi.org/10.3390/v13030511
- Tisthammer KH, Forsman ZH, Toonen RJ, Richmond RH. 2020. Genetic structure is stronger across human- impacted habitats than among islands in the coral Porites lobata. PeerJ 8:e8550 http://doi.org/10.7717/peerj.8550
- Brown NP, Forsman SH, Tisthammer KH, Richmond RH. 2020. A resilient brooding coral in the broadcast spawning *Porites lobata* species complex: a new endemic, introduced species, mutant, or new adaptive potential? Coral Reefs 39: 809–818
- Caudill V†, Qin S†, Winstead R†, Kaur J†, Pineda EG†, Tisthammer KH et al. 2020. CpG-creating mutations are costly in many human viruses. Evolutionary Ecology 34:339–359
- Forsman ZH, Ritson-Williams R, Tisthammer KH, I. S. S. Knapp, Toonen, RJ. 2020. Host-symbiont coevolution and diversification by habitat in a coral species complex (Scleractinia; Poritidae). Scientific Reports 10:16995
- Richmond RH, Tisthammer KH, Spies NP. 2018. The Effects of Anthropogenic Stressors on Reproduction and Recruitment of Corals and Reef Organisms. Frontiers in Mar. Science 5: 226
- Tisthammer KH, Richmond RH. 2018. Corallite skeletal morphological variation in Hawaiian *Porites lobata* Coral Reefs 37: 445–456. DOI 10.1007/s00338-018-1670-5
- Tisthammer KH, Richmond RH. 2017. Local adaptation of the lobe coral, *Porites lobata*. KAIYO Monthly 49:173-180
- Forsman ZH, Knapp ISS, Tisthammer KH, Eaton DAR, Belcaid M, Toonen, RJ. 2017. Coral hybridization or phenotypic variation? Genomic data reveal gene flow between *Porites lobata* and *P. Compressa*. Molecular Phylogenetics & Evolution, 111:132-148
- Tisthammer KH, Forsman ZH, Sindorf VL, Massey TL, Bielecki CR, Toonen RJ. 2016. The complete mitochondrial genome of the lobe coral Porites lobata (Anthozoa: Scleractinia) sequenced using ezRAD. Mitochondrial DNA part B: 1:247–249. doi:10.1080/23802359.2016.1157770
- Tisthammer KH. 2016. Coral Molecular Biomarkers. Costal Wiki (http://www.coastalwiki.org/wiki/Coral_Molecular_Biomarkers)
- Tisthammer KH, Cobian GM, Amend AS. 2016. Global Biogeography of Marine Fungi is Shaped by the Environment, Fungal Ecology 19: 39-46, DOI:10.1016/j.funeco. 2015.09.003
- Hoshino* K, Brandt M, Manfrino C, Riegl B, Steiner S. 2003. Assessment of the coral reefs of the Turks and Caicos Islands (Part 2: fish communities). Atoll Research Bulletin, 496: 480-499
- Beck M, Heck K, Able K, Childers D, Eggleston D, Gillanders B, Halpern B, Hays C, Hoshino K*, Minello T, Orth R, Sheridan P, Weinstein M. 2003. The role of nearshore ecosystems as fish and shellfish nurseries. Issues in Ecology, 11:1-12
- Riegl B, Manfrino C, Hemoyian C, Brandt M, Hoshino* K. 2003. Assessment of the coral reefs of the Turks and Caicos Islands (Part 1: stony corals and algae). Atoll Research Bulletin 496: 460-479

- Beck M, Heck K, Able K, Childers D, Eggleston D, Gillanders B, Halpern B, Hays C, Hoshino K*, Minello T, Orth R, Sheridan P, Weinstein M. 2001. The Identification, Conservation, and Management of Estuarine and Marine Nurseries for Fish and Invertebrates. BIoScience 51: 633–641

† Undergraduate and Master's student co-authors

* Last name changed to 'Tisthammer' from 'Hoshino'

## SELECT PRESENTATIONS

- Tisthammer KH. 2022. Population genomics of Pacific herring (*Clupea pallasii)* in Alaska*.* Coastal and Marine Sciences Institute Symposium 2022, Bodega Marine Laboratory
- Tisthammer KH. 2021. Shotgun proteomics revealed differences in protein expression across stressor gradients in *Porites lobata.* 14th International Coral Reef Symposium
- Tisthammer KH. 2021. Surviving in high-stress environments: Physiological and molecular responses of lobe coral indicate nearshore adaptations to anthropogenic stressors. Rosenberg Institute Spring Seminar Series, the Estuarine and Ocean Science Center, SFSU
- Tisthammer KH. 2020. SARS-CoV-2 vaccine development: Why does it take so long? Science Up Covid-19, San Francisco State University
- Tisthammer KH. 2019. *In vivo* mutation frequencies and fitness costs of Hepatitis C virus. Bay Area Population Genomics Conference (BAPG) XVIII
- Tisthammer KH. 2019. In vivo population genomics of Hepatitis C virus. GRC: Ecological & Evolutionary Genomic
- Tisthammer KH. 2018. Using proteomics to assess coral phenotypes in response to local chemical stressors 2018-Ocean Sciences Meeting
- Tisthammer KH. 2017. Effects of PCBs on corals and the genetic effects of toxicants at the population level. Hawaii Department of Health Ecological Research Workshop.
- Tisthammer KH. 2017. Using proteomics and genetics as coral reef conservation tools. Hawaii Conservation Conference.
- Tisthammer KH, Richmond RH. 2017. Isolation by adaptation? Genetic basis for environmental stress resilience in corals. 2017-Aquatic Sciences Meeting
- Tisthammer KH, Seneca FO, Richmond RH. 2016. Understanding coral's short-term adaptive ability to water pollution using genetics and proteomics. 13th International Coral Reef Symposium

## SELECT ACTIVITIES & PROFESSIONAL AFFILIATIONS

- Adjunct Faculty, University of Hawaii at Manoa, 2022 - Current
- Adjunct Faculty, San Francisco State University, 2021 - Current
- Postdoctoral Associate, Center for Population Biology, University of California Davis, 2022
- Member, Genetic Society of America, 2019, 2022
- Member, International Coral Reef Society, 2013 - Current
- Completed Meta-analysis in ecology, evolution and environmental sciences course by PR Statistics, 2020
- Faculty Mentor for the Summer Coding Immersion Program at San Francisco State University, 2020
- Faculty Advisor for the Big Data Summer Program at San Francisco State University, 2019
- Invited Member of the Golden Key International Honour Society, 2013-present
- Science Fellow, the National Network for Ocean and Climate Change Interpretation, 2018-2019
- Mentor & Treasurer, 'Ilima SACNAS Chapter at University of Hawaii, 2015-2018
- Judge, Hawaii State Science & Engineering Fair, 2017, 2018
- Science Mentor, the Hawaii State Science & Engineering Fair, 2016, 2017, 2018
- Education Committee Member (Created a mentoring program), 13th International Coral Reef Symposium, 2016

## LANGUAGE

- Proficient in Japanese and English (Hawaii State Certified Court Interpreter)

## SCUBA Related Certifications

- AAUS Scientific Diver (Master Scuba/Rescue Diver -NAUI)
- Divers Alert Network First Aid

## COMPUTER/TECHNICAL SKILLS

- Programming languages: R (e.g. vcfR, tidyverse, Rsamtools, Bioconductor), Python (e.g. pandas, numpy, sklearn, flask), SQL, Matlab
- Genomics: BBTools, BWA, Samtools, vcftotools/bcftools, Plink, ANGSD, BLAST+, Eigensoft, Freebayes, GATK, PEAR, POFAD, pyRAD, Stacks, STRUCTURE, FastQC, etc.
- Genetics & Phylogenetics: Arlequin, Geneious, IMA, MEGA, PHASE, SplitsTree, TCS, BEAST, MrBayes, RAxML, PhyML, JmodelTest, HyPhy
- Proteomics: Qspec, Compass, CRUXtoolkit, ProteinScape, Transdecoder, Abacus
- Machine Learning(ML)/Stats: ML (LR, SVM, RF, XGBoost), Multivariate analysis (PCoA, CCA, NMDS), GLM/Beta regression
- Others: ImageJ, Image Studio, Google Earth, LaTEX, Adobe Suites, PRIMER