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
- Analyzed temporal genomic data to assess the causes of population collapse of Pacific herring in the Prince William Sound, Alaska following the Exxon Valdez oil spill
- 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 - Current
- 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

REFERENCES

- Dr. Robert Richmond, Professor/Director, Kewalo Marine Laboratory, University of Hawaii at Manoa. Email: richmond@hawaii.edu, Phone: (808) 539-7331
- Dr. Pleuni Pennings, Associate Professor, Department of Biology, San Francisco State University. Email: pennings@sfsu.edu, Phone: (617) 417-7311
- Dr. Andrew Whitehead, Professor, Department of Environmental Toxicology, University of California, Davis. Email: awhitehead@ucdavis.edu, Phone: (530) 754-8982
- Dr. Sarah Cohen, Professor, Estuary and Ocean Science Center, Department of Biology, San Francisco State University. Email: sarahcoh@sfsu.edu, Phone: (415) 338-3750