Emma Choi

120 N Frontage Rd #136
Mansfield Center, CT 06250
619-852-2705
emmasuechoi@gmail.com

Education

University of California San Diego — San Diego, CA
Bachelor of Science in General Biology — Graduated with 3.19 March 2019

University of California San Diego — San Diego, CA
Scripps Institution of Oceanography — Graduated with 4.0 June 2020
Master of Science in Marine Biology

University of Connecticut — Storrs, CT
PhD in Ecology and Evolutionary Biology — Expected graduation 2027

Skills

Field: Plankton Tows, eDNA collections
Computer: R, Bash, Cervus, Microsoft Office, G Suite, Python (Basic), Geneious, Sequencher
Lab: DNA extractions (Qiagen, Phenol-Chloroform, Promega-IQ), PCR, gel electrophoresis, DNA purification (Ampure beads, Sephadex, exo-sap), DNA quantitation (nanodrop and qubit), DNA barcoding, Sanger sequencing, fragment analysis (3130 Genetic Analyzer), metabarcoding, eDNA, BioAnalyzer, library prep, DNA enrichment, next generation sequencing (MiSeq)

Experience

University of Connecticut — Storrs, CT
PhD Student — August 2022 – Current

- Modeling co-evolution between stickleback and tapeworms in Vancouver Island lakes using SLiM software

San Diego Zoo Wildlife Alliance — Escondido, CA
Senior Research Associate — April 2021 – June 2022

- Generated SNP data for bighorn sheep using a target enrichment to assess population structure in Baja, CA
- Checked genomic coverage of DNA enrichment for the bighorn sheep project using a variety of tools in Bash
- Reconstructed jaguar diets from fecal samples using metabarcoding to compare diets in pristine vs disturbed habitats
- Completed genetic services such as molecular sex determination, parentage, relatedness, and identity tests
- Assisted in the California condor recovery program by genotyping all condors born in captivity and the wild and providing sex determination, parentage, identity, and disease screening tests as needed
- Served as lab manager, which includes tasks such as lab organization, supply inventory, and maintaining databases
- Promoted group discussions regarding diversity, equity, and inclusion, identifying ways to improve our organization's work environment and the field of evolutionary biology, and working to have those ideas implemented

San Diego Zoo Wildlife Alliance — Escondido, CA
Research Associate — September 2020 – April 2021

- Conducted relatedness analyses in R for multiple captive populations including mice, frogs, and burrowing owls
- Compile the annual genetics report on pacific pocket mouse that includes measures of genetic diversity (i.e., H_O, H_E, A_R, allele count, and F_{IS}) in the captive population and the reproductive success of individuals in the recovery program
- Conducted parentage tests in Cervus for captive and wild infant animals using microsatellites for a variety of species
- Determined sex for a variety of species using PCR (e.g. hyenas, Hawaiian birds, sloths, tamanduas, shrikes)
- Harvested tissue culture cells (grown by a different department), stored them properly, and managed their database
- Extracted DNA from various sources (e.g. tissue, blood, hair, feces, feather, FTA card) using a variety of methods (e.g. Qiagen spin columns, phenol-chloroform, Promega IQ – magnetic stand, chelex resin)

Scripps Institution of Oceanography — La Jolla, CA
Research Assistant — June 2020 – August 2020

- Utilized R to run analyses on fish spawning activity and to create data visualizations summarizing spawning activity

- Compiled research results, figures and text, into scientific manuscripts and submitted to peer-reviewed journals
- Managed fish egg collections and processing of eggs, including DNA extractions, PCRs, gels, and sequencing
- Taught undergraduate volunteers and new master's students the protocol for monitoring fish spawning activity
- Developed and optimized protocols to analyze fish populations using eDNA and metabarcoding techniques

Scripps Institution of Oceanography — La Jolla, CA
Master's Student — March 2019 – June 2020

- Monitored spawning activity of marine fishes via ichthyoplankton surveys on spatial and temporal scales
- Characterized the annual and seasonal trends in spawning activity and the deviations from those trends
- Explored the role of sea surface temperature in driving the magnitude of annual peaks in fish egg abundance
- Analyzed the species diversity of fish egg abundance associated with the number of eggs identified annually
- Identified differences in species diversity of fish communities on either side of a biogeographic boundary
- Pulled tissue samples from fish specimens, extracted the DNA using a DNeasy kit, and sequenced the 12S genes to create a reference database of 12S genes for California marine fish species
- Utilized DNA barcoding to identify spawning species (i.e. DNA extraction, PCR, gel, sequencing)

Scripps Institution of Oceanography
Volunteer Research Assistant — October 2017 – March 2019
Research Experience for Undergraduates — June 2018 – September 2018

- Assessed the development times of groups of copepods after varying exposures to thermal stress
- Collected plankton using a vertical plankton tow and counted the number of fish eggs present in the sample
- Extracted DNA from individual fish eggs – a single collection could contain up to 1000 eggs for processing
- Amplified barcoding genes (COI and 16S) for fish using PCR – processed hundreds of reactions simultaneously
- Determined which samples were successfully amplified by checking band size on a gel electrophoresis
- Purified the PCR products using spin columns and sent the purified products out for Sanger Sequencing
- Identified the species each egg belonged to by BLASTing the sequence results on the NCBI database

Certifications

University of Washington: Summer Institute in Statistical Genetics — Online
Applications of Population Genetics & Multivariate Analysis for Genetic Data — Completed July 2021

University of South Florida Muma College of Business — Online
Diversity, Equity, and Inclusion in the Workplace Certificate — Completed May 2021

Supervision

Natalie Fairve – undergraduate research assistant (2019 – 2020, UCSD)
Alexis (Cody) Hargadon – undergraduate research assistant (summer 2019, UCSD)

Honors and Awards

Jorgenson Fellowship (2022)
Received from University of Connecticut graduate school for 5 years of PhD stipend. Granted $100,000.

SIO Department Graduate Student Excellence Travel Award (2020)
Received from Scripps Institution of Oceanography graduate division for conference travels. Granted ~$750.

Publications

Choi, E. S., Furtado, L. E., Burton, R. S. (2021) Spatial and temporal variation in the species diversity of coastal California fish eggs. *Marine Ecology Progress Series, 669*, 139-149.

Gold, Z., Curd, E. E., Goodwin, K., Choi, E., Frable, B., Thompson, A. R., Walker Jr, H. J., Burton, R. S., Kacev, D., Martz, L. D., Barber, P. H. (2021) Improving Metabarcoding Taxonomic Assignment: A Case Study of Fishes in a Large Marine Ecosystem. *Molecular Ecology Resources*, *21*(7), 2546-2564.
I participated in conceptualization, data procurement, and writing.

Choi, E. S., Saberski, E. T., Lorimer, T., Smith, C., Kandage-don, U., Burton, R. S., Sugihara, G. (2020) The importance of making testable predictions: a cautionary tale. *PLoS one, 15(*12*)*, e0236541.

Presentations

Choi, Emma, Steiner, Cynthia, & Wilder, Aryn. Creating a SNP genotyping tool from non-invasive samples to explore variation in the Peninsular bighorn sheep. Molecular Scientific Advisory Group, Association of Zoos and Aquariums 2022 mid-year meeting. April 21, 2022.

Choi, Emma. Monitoring spatiotemporal variation in the spawning activity of marine fishes through the molecular identification of eggs. Master's thesis defense, Scripps Institution of Oceanography. June 3, 2020. [over zoom]

Choi, Emma. Monitoring temporal and spatial variation in the near shore spawning activity of marine fishes along the California coast via the molecular identification of fish eggs. California-Nevada American Fisheries Society Annual Meeting; Fisheries Success Stories. March 15, 2020. [Canceled due to Covid-19]

Relevant Course Work

Genetics, Molecular Methods of Evolution and Ecology Lab, Molecular Biology, Evolution Chemistry, Marine Molecular Ecology Metabolic Biochemistry, Organic chemistry, Data Analysis and Inference, Mathematical Reasoning, Introduction to Probability, Organismic and Evolutionary Biology, Evolution of Infectious Diseases, Communicating Science to Informal Audiences, Behavior and Ecology of Fishes, Quantitative Ecology Project Lab, Quantitative Theory of Populations and Communities