Zachary Gold

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Appointments

**Postdoctoral Scholar**, **NOAA Northwest Fisheries Science Center & University of Washington** – The Cooperative Institute for Climate, Ocean, and Ecosystem Studies, June 2020 - present

Advisors – Dr. Kim Parsons & Professor Ryan Kelly

Professional Affiliations

**Research Associate**, **Natural History Museum of LA County** – March 2019 - present

Collaborators – Dr. Regina Wetzer & Dean Pentcheff

**Member, Assoc. for the Sciences of Limnology & Oceanography** – Mar. 2021 - present

Education

**Ph.D., UCLA**, Ecology and Evolutionary Biology, 2020.

Advisor – Professor Paul Barber

Thesis – *Design and Implementation of Environmental DNA Metabarcoding Methods for Monitoring the Southern California Marine Protected Area Network*

**B.S. Stanford University**, Marine Biology with Honors, Minor in Environmental Systems Engineering, 2015.

Advisors – Professors Stephen Palumbi and Alexandria Boehm

Thesis – *Long Term Growth Rates and Effects of Bleaching in Acropora hyacinthus*

**Awards and Honors**

***Graduate***

2020 Los Angeles Sustainability Collaborative Fellowship

2019 Heal the Bay Super Healer Award

2019 NSF Graduate Research Internship Project Award

2019 Outstanding Grad. Poster, UCLA EEB Research Symposium, 3rd prize

2018 UCLA EEB Special Faculty Award for Departmental Service

2017 Outstanding Grad. Poster, UCLA EEB Research Symposium, 2nd prize.

2016 National Geographic Young Explorer Program

2015 National Science Foundation Graduate Research Fellowship

2015 UCLA Graduate Dean’s Scholar Award

***Undergraduate***

2013 NOAA Ernest F. Hollings Undergraduate Scholarship

2014 Moris K. Udall and Stewart L. Udall Scholarship

2012 Marine Technology Society Undergraduate Scholarship

Grants

Jan. 2020 – Dec. 2020. La Kretz Center for California Conservation Science ($4,800)

*Investigating Patterns of Larval Fish Community Dynamics Over the Past Two Decades Using a Novel Application of Environmental DNA*.

April 2018 – April 2019. National Science Foundation GRIP Award ($5000)

*Investigating Patterns of Larval Fish Community Dynamics Over the Past Two Decades Using a Novel Application of Environmental DNA*.

April 2018 – April 2019. UCLA EEB Department Grant **(**$3,000)

*Citizen Scientist’s Message in a Bottle: Rapid eDNA assessments of marine biodiversity to evaluate the effectiveness of Los Angeles’ marine protected areas*.

Jan. 2018 – Dec. 2019. Resource Legacy Fund – Marine Conservation Grant **(**$15,000)

*Rapid eDNA assessments of marine biodiversity to evaluate the effectiveness of marine protected areas*. Total support:

April 2017 – April 2018. UCLA EEB Department Grant ($1,500)

*Rapid* *eDNA assessments of marine biodiversity to evaluate the effectiveness of marine protected areas*.

Dec. 2016 – Dec. 2017 La Kretz Center for California Conservation Science ($2,400)

*Citizen Scientist’s Message in a Bottle: Rapid eDNA assessments of marine biodiversity to evaluate the effectiveness of Los Angeles’ marine protected areas*.

Sept. 2016 – Sept. 2017. National Geographic Society – Young Explorer Grant ($4,800)

*Rapid eDNA assessments of marine biodiversity to evaluate the effectiveness of marine protected areas*.

April 2016 – April 2017**.** Sigma Xi Grants-in-Aid ($900)

*Rapid* *eDNA assessments of marine biodiversity to evaluate the effectiveness of marine protected areas*.

April 2016 – Dec. 2017. International SeaKeeper Society Support **($**2,000 in vessel time)

*eDNA assessments of marine biodiversity to evaluate the effectiveness of marine protected areas in the California Channel Islands*.

April 2016 – April 2017 UCLA EEB Department Grant ($1,500)

*Rapid* *eDNA assessments of marine biodiversity to evaluate the effectiveness of marine protected areas*.

Mar. 2016 – Mar. 2017. UC Catalyst Grant for Conservation Genomics Grant ($43,000)

PI is Paul Barber, I am grant co-author. *Rapid eDNA assessments of marine biodiversity to evaluate the effectiveness of marine protected areas in the California Channel Islands*.

Dec. 2015 – Dec. 2016. La Kretz Center for California Conservation Science($1,400)

*eDNA assessments of marine biodiversity to evaluate the effectiveness of marine protected areas*.

Sept. 2015 – Dec. 2020. NSF Graduate Research Fellowship Program($138,000)

*The Individual and Synergistic Effects of Four Anthropogenic Stressors on Coral Reef*

*Ecosystem Health.*

Peer Reviewed Publications

**Gold, Z.**, Curd, E., Goodwin, K., Choi, E., Frable, B., Thompson, A., Burton, R., Kacev, D. and Barber, P., (2021). Improving Metabarcoding Taxonomic Assignment: A Case Study of Fishes in a Large Marine Ecosystem. *Molecular Ecology Resources.* Accepted*.*

**Gold, Z**., Sprague, J., Kushner, D. J., Zerecero Marin, E., & Barber, P. H. (2021). eDNA metabarcoding as a biomonitoring tool for marine protected areas. *PLOS One*, *16*(2), e0238557.

Min, M. A., Barber, P. H., & **Gold, Z.** (2021). MiSebastes: An eDNA metabarcoding primer set for rockfishes (genus Sebastes). *Conservation Genetics Resources*, 1-10.

Ely, T., Barber, P. H., Man, L., & **Gold, Z.** (2021). Short-lived detection of an introduced vertebrate eDNA signal in a nearshore rocky reef environment. *PLOS One*, *16*(6), e0245314.

Monuki, K., Barber, P., & **Gold, Z.** (2021). eDNA Captures Depth Partitioning in a Kelp Forest Ecosystem. *PLOS One,* 16 (11), e0253104.

Marwayana, O.N., **Gold, Z.**, Meyer C., and Barber, P.H., (2021). Environmental DNA in a Global Biodiversity Hotspot: Lessons from Coral Reef Fish Diversity Across the Indonesian Archipelago. *Environmental DNA*. Accepted.

Willette, D. A., Navarrete-Forero, G., **Gold, Z.**, Lizano, A. M. D., Gonzalez-Smith, L., & Sotil, G. (2021). Characterizing Industrial and Artisanal Fishing Vessel Catch Composition Using Environmental DNA and Satellite-Based Tracking Data. *Foods*, *10*(6), 1425.

Lin, M., Simons, A.L., Curd, E.E., Harrigan, R.J., Schneider, F.D., Ruiz-Ramos, D.V., **Gold, Z.**, Osborne, M.G., Shirazi, S., Schweizer, T.M. and Moore, T.N., (2020). Landscape analyses using eDNA metabarcoding and Earth observation predict community biodiversity in California. *Ecological Applications*, e2379.

Meyer R., Ramos M., Lin M., Schweizer T., **Gold Z.**, Ramos D., Shirazi S., Kandlikar G., Kwan W., Curd E., Freise A., Parker J., Sexton J., Wetzer R., Pentcheff N., Wall A., Pipes L., Garcia-Vedrenne A., Mejia M., Moore T., Orland C., Ballare K., Worth A., Beraut E., Aronson E., Nielsen R., Lewin H., Barber P., Wall J., Kraft N., Shapiro B., Wayne R. (2021). The CALeDNA program: Citizen scientists and researchers inventory California's biodiversity. Calif Agr 75(1):20-32. https://doi.org/10.3733/ca.2021a0001.

**Gold, Z**., Wall, A.R., Curd, E.E., Kelly, R.P., Pentcheff, N.D., Ripma, L., Barber, P.H. and Wetzer, R., (2020). eDNA metabarcoding bioassessment of endangered fairy shrimp (Branchinecta spp.). *Conservation Genetics Resources*, *12*(4), pp.685-690.

**Gold, Z.**, 2020. *Design and implementation of environmental DNA metabarcoding methods for monitoring the Southern California marine protected area network* (Doctoral dissertation, UCLA).

Curd, E. E., **Gold, Z.,** Kandlikar, G. S., Gomer, J., Ogden, M., O'Connell, T., Pipes, L., Schweizer, T. Rabichow, L., Lin, M., Shi, B., Barber, P.H., Kraft, N., Wayne, R., Meyer, R. (2019). Anacapa Toolkit: an environmental DNA toolkit for processing multilocus metabarcode datasets. *Methods in Ecology and Evolution*, 10(9), 1469-1475.

**Gold, Z.,** & Palumbi, S. R. (2018). Long-term growth rates and effects of bleaching in *Acropora hyacinthus*. *Coral Reefs*, *37*(1), 267-277.

Kandlikar, G. S., **Gold, Z.** J., Cowen, M. C., Meyer, R. S., Freise, A. C., Kraft, N. J., Moberg-Parker, J., Sprague, J., Kushner, D. J., Curd, Emily E (2018). ranacapa: An R package and Shiny web app to explore environmental DNA data with exploratory statistics and interactive visualizations. *F1000Research*, *7*.

Manuscripts In Preparation

**Gold, Z**., Kelly, R., Shelton, A.O., Goodwin, K.,Gallego, R., Thompson, L., Kacev, D., Thompson, A., Barber, P.H. (*in prep*). Message in a Bottle: Archived DNA Reveals Impacts of a Marine Heatwave on Fish Assemblages Over Multiple Decades. Submitted to *Science Advances*.

**Gold, Z**., Koch, M.Q., Schooler, N.K., Emery, K.A, Dugan, J.E., Miller, R.J., Page, H.M, Schroeder, D.M., Hubbard, D.M., Madden, J., Whitaker, S.G., Barber, P.H. (*in prep)*. Scoping the Line Up: A Comparison of Biomonitoring Methodologies for Surf Zone Fish Communities. (Submitted to *PLOS One Biology*).

**Gold, Z.**, Wall., A.R., Schweizer, T.M., Pentcheff, D.N., Curd, E.E., Barber, P.H., Wetzer, R. Barber, P.H., Meyer, R., Wayne, R., Stolzenbach, K., Prickett, K., Luedy, J., Wetzer, R. (*in prep).* Should you use eDNA?: A Manager’s Guide to Using eDNA Metabarcoding in Marine Ecosystems. (Target Journal *PLOS One Biology).*

**Gold, Z.**, R., Kelly, R., Jensen, A., Shelton A.O., R., Gallego, Sprague, J., Kushner D.J., McMillan, S., Freiwald, J., Kavanaugh, K., Ambrose, R. , Barber, P.H. (*in prep*). eDNA Biodiversity Assessment of Southern California Marine Protected Area Network. (Target Journal *PNAS*).

Parsons,K., May,S., **Gold, Z.**, Morin, P. (*in prep*) Population genetic structure of harbor porpoise in Alaska. (Target Journal *Marine Mammal Science).*

Academic Presentations

***Oral Presentations***

October 12th, 2021. MBARI, Moss Landing, CA, USA

*Marine-Heat-Wave-Driven Shifts in Larval Fish Community Dynamics Over the Past Two Decades Revealed Through Metabarcoding*

June 23rd, 2021. ASLO Virtual Aquatic Science Meeting, Majorca, Spain,

*Combining eDNA And Visual Survey Methods For Comprehensive Biomonitoring Of The Southern California Marine Protected Area Network*

March 18th, 2021. Genetics and Evolution, NOAA NWFSC, Seattle, Washington

*The Anacapa Toolkit*

March 1st, 2021. Seattle-Kobe International Academic Exchange Initiative, Kobe, Japan

*Marine-Heat-Wave-Driven Shifts in Larval Fish Community Dynamics Over the Past Two Decades Revealed Through Metabarcoding*

February 23rd, 2021. NOAA Bioinformatics Supergroup, NOAA AOML, Miami, Florida

*Improving Metabarcoding Taxonomic Assignment – A Case Study of Fishes in the California Current Large Marine Ecosystem*

February 4th, 2021. California Molecular Methods Working Group, Costa Mesa, California

*eDNA Metabarcoding - Advances for California Current Large Marine Ecosystem Biomonitoring*

October 6th, 2020. Stanford Hopkins Marine Station, Monterey, California

*eDNA Metabarcoding - Advances for California Current Large Marine Ecosystem Biomonitoring*

September 9th, 2020. NOAA Bioinformatics Supergroup, NOAA AOML, Miami, Florida

*The Anacapa Toolkit*

July 7th, 2020. Conservation Biology Division, NOAA NWFSC, Seattle, Washington

*eDNA Metabarcoding - Advances for California Current Large Marine Ecosystem Biomonitoring*

February 19th, 2020. Ocean Sciences Meeting, San Diego, California

*Investigating Patterns of Larval Fish Community Dynamics Over the Past Two Decades*

December 2nd, 2019. CalCOFI Conference, La Jolla, California

*Investigating Patterns of Larval Fish Community Dynamics Over the Past Two Decades*

November 1st,2019. Western Society of Naturalists, Ensenada, Baja California, Mexico

*eDNA: Novel Molecular Techniques for Monitoring MPAs*

June 27th, 2019. Ocean Protection Council, Sacramento, California

*eDNA: Novel Molecular Techniques for Monitoring MPAs*

May 29th, 2019. eDNA and Global Change Workshop, University of Washington, WA

*Applying Marine eDNA*

May 1st, 2019. Natural History Museum of LA County, Los Angeles, California

*eDNA: Preliminary Comparison of Methods in Ports of LA and LB*

March 28th, 2019. La Kretz Conservation Genomics Workshop, Stunt Ranch Reserve, CA

*eDNA: Novel Molecular Techniques for Monitoring Biodiversity*

February 5th, 2019. Waitt Foundation Blue Economy SIDs Workshop, UCLA, California

*Fisheries in the Blue Economy*

February 4th, 2019. UCLA Conservation Genomics Consortium Meeting, UCLA, California

*eDNA in Vernal Pools: Monitoring Endangered Species and Threatened Aquatic Ecosystems*

November 8th, 2018. UCGCC eDNA Conference, Asilomar, California

*eDNA: Novel Molecular Techniques for Monitoring Aquatic and Marine Ecosystems*

October 10th, 2018. UCLA EEB Graduate Seminar Series, UCLA, California

*Anacapa Toolkit*

May 16th, 2018. MPA Technology Workshop, La Jolla, California

*eDNA: Novel Molecular Techniques for Monitoring MPAs*

March 26th, 2018. La Kretz Conservation Genomics Workshop, Stunt Ranch Reserve, CA

*eDNA: Novel Molecular Techniques for Monitoring Biodiversity*

February 28th, 2018. Leonardo Dicaprio Foundation, Los Angeles, CA

*eDNA: Novel Molecular Techniques for Monitoring the Oceans*

February 23rd, 2018. La Kretz Conservation Agency Workshop, Stunt Ranch Reserve

*eDNA Assessment of Biodiversity: Capabilities and Caveats of Novel Metabarcoding Approaches*

January 18th, 2018. UCLA Ecology and Evolutionary Biology Graduate Seminar Series.

*Long Term Growth Rates and Effects of Bleaching in Acropora hyacinthus*

December 1st, 2017. UCGCC eDNA Workshop, UCLA, California

*Spatial and Temporal Variation of Environmental DNA in Kelp Forest Ecosystems,*

August 15-18th, 2017. UCGCC Conference, Blue Oak Reserve, California

*Developing and Implementing an Aquatic eDNA Methodology*

October 2-6th, 2017. Indo-Pacific Fish Conference, Papeete, Tahiti, French Polynesia

*Spatial Variation of Environmental DNA in Coral Reef Ecosystems*

July 23-28th, 2017. Gordon Research Conference Marine Molecular Ecology, HKUST, HK

*Spatial and Temporal Variation of Environmental DNA in Kelp Forest Ecosystems*

June 1, 2017. UCLA EEB Department Graduate Student Seminar Series, UCLA, CA

*Spatial and Temporal Variation of eDNA in Kelp Forest Ecosystems*

March 25th, 2017. La Kretz Conservation Genomic Workshop, Stunt Ranch Reserve, CA

*Environmental DNA: History, Background, Applications, and Bioinformatics*

December 11, 2016. UCLA EEB Department Graduate Student Seminar Series, UCLA, CA

*Designing and Implementing an Environmental DNA Methodology*

May 16th, 2015. Stanford Honors Thesis Symposium 2015, Stanford University, CA

*Growth Patterns and Life History Strategies of Thermally Resilient and Susceptible Acropora hyacinthus species*

August 8th, 2014. NOAA Hollings Symposium, NOAA Headquarters, Silverspring, MD

*Forecasting Ocean Acidification and Pteropod Calcification off the Washington and Oregon Coast*

Nov. 25th, 2013. Targeted Research Project Symposium, U. Queensland, Brisbane AUS

*Coral Recruitment in Moreton Bay*

July 23rd, 2013. Stanford Coral Symposium, Palau International Coral Reef Center, Palau

*Macrobioeroder Density As a Bioindicator for Chronic Water Quality Pollution*

June 11th, 2013. Sea Education Association Symposium, SSV Robert C. Seamans, Hawaii

*Algal, Coral, and Reef herbivore Observations across a Predator Overfishing and nutrient Regime Axis*

***Poster Presentations***

March 9-11th, 2021. DNAqua International Conference, online

*Marine-Heat-Wave-Driven Shifts in Larval Fish Community Dynamics Over the Past Two Decades Revealed Through Metabarcoding*

December 10h, 2018. 9th Nat’l. Summit on Coastal & Estuarine Restoration & Mgmt., CA

*eDNA: Novel Molecular Techniques for Monitoring Marine Protected Areas*

May 22nd, 2019. UCLA Biology Research Symposium, UCLA, CA.

*Biomonitoring of Threatened Southern California Vernal Pool Ecosystems Using eDNA*

May 22nd, 2018. UCLA Biology Research Symposium, UCLA, CA.

*eDNA: Novel Molecular Techniques for Monitoring Marine Protected Areas*

May 24th, 2017. UCLA Biology Research Symposium, UCLA, CA.

*Long-term growth rates and effects of bleaching in Acropora hyacinthus*

Public Outreach

August 8th, 2019. CaleDNA LA River Workshop, UCLA, California

*eDNA Community Science with Heal the Bay’s MPAWatch Program*

June 12th, 2019. Heal the Bay MPAWatch Spring Training, Santa Monica, California

*Heal the Bay’s eDNA MPAWatch Program*

February 22nd, 2019. Heal the Bay MPAWatch Winter Training, Santa Monica, California

*Heal the Bay's eDNA MPAWatch Program*

February 22nd, 2019. Heal the Bay MPAWatch Winter Training, Santa Monica, California

*Heal the Bay’s eDNA MPAWatch Program*

September 17nd, 2018. Heal the Bay MPAWatch Fall Training, Santa Monica, California

*Heal the Bay’s eDNA MPAWatch Program*

April 19th, 2018. UCLA EEB Department Graduate Seminar Series, UCLA, CA

*Photographing Nature: using Photography to Communicate Science and Biodiversity*

June 5th 2014. Conservation Lecture Series, Stanford Hopkins Marine Station, California

*Giving up the Bacon: Protecting the Ocean by Going Vegetarian*

Conferences and Workshops

June 2021. ASLO Aquatic Science Meeting, Virtual

March 2021. DNAqua International Conference, Virtual

December 2020. CalCOFI Conference, Virtual

November 2020. POGO - Use of eDNA in Marine Environments, Virtual

February 2020. Ocean Sciences Meeting, San Diego, CA

November 2019. Western Society of Naturalists, Baja California, Mexico

August 2019. CALeDNA LA River Workshop, UCLA, CA

May 2019. eDNA and Global Change Workshop, University of Washington, WA

March 2019. La Kretz Conservation Genomic Workshop, Stunt Ranch Reserve, CA

Dec. 2018. National Conference on Marine Environmental DNA, Rockefeller Univ., NY

Dec. 2018. UC Conservation Genomics Consortium eDNA Conference, Asilomar, CA

May 2018. California Marine Protected Areas Technology Workshop, La Jolla, CA

March 2018. La Kretz Conservation Genomic Workshop, Stunt Ranch Reserve, CA

Feb. 2018. La Kretz Conservation Management Workshop, Stunt Ranch Reserve, CA

December 2017. UC Conservation Genomics Consortium eDNA Conference, UCLA

October 2017. Indo-pacific Fish Conference, Papeete, Tahiti, French Polynesia

Aug. 2017. UC Conservation Genomics Consortium Conference, Blue Oak Reserve, CA

July 2017. Gordon Research Conference Marine Molecular Ecology, HKUST, Hong Kong

July 2017. Gordon Research Seminar Marine Molecular Ecology, HKUST, Hong Kong

March 2017. La Kretz Conservation Genomic Workshop, Stunt Ranch Reserve

Sept. 2015. eDNA Working Group Meeting and Workshop, Bangor University, Wales

Teaching Experience

Fall Quarters 2017, 2018 & 2019. Teaching Assistant for Introduction to Marine Science

Winter and Spring Quarters 2015. TA for Stanford’s Jasper Ridge Biological Preserve

Winter Quarters 2013 & 2014**.** Teaching Assistant for Photographing Nature

Fall Quarter 2012. TA for The Global Warming Paradox

Courses qualified to teach: Marine Science, Marine Ecology, Community Ecology, Bioinformatics, Conservation Genetics, Conservation Biology, Marine Conservation, Invertebrate Zoology, Ichthyology, Computational Biology

Mentorship Experience

June 2019. UCLA Entering Mentoring Training Program Certificate – NIH Supported.

Mentored Hollings Scholar at NOAA NWFSC and 11 undergraduate and 6 masters students at UCLA, including 4 Honors Thesis Projects and 5 mentee led peer reviewed manuscripts. Six mentees have started marine science PhD programs, two receiving the NSF GRFP.

Certificates

Dec. 2015 – 2020. UCLA IoES Leadership in Sustainability Certificate Program.

Project: *Leading community science eDNA effort with Heal the Bay’s MPAWatch program.*

2012 – present. AAUS Certified Scientific Diver

Volunteer Experience

***Department***

January 2021 – present. CICOES DEI Outreach Committee member

March 2018 – June 2020. UCLA EEB Conservation Genomics Consortium Grad. Rep.

Fall 2017 – Spring 2019. UCLA IOES Marine Center Graduate Student Representative

Fall 2017 – Spring 2018. UCLA EEB Ecology and Evolution Graduate Seminar Series

March 2017 – present. Bruin Naturalist Club Board Member

September 2018 – Spring 2019. Biological Science Council Graduate Student Rep.

Dec. 2017 – May 2020. UCLA Diver Safety Committee Graduate Student Representative

***Community***

June 2020 – present. UAW 4121 Climate Justice Working Group

September 2020 – present. Social Justice League Temple de Hirsch Sinai

November 2020 – March 2021. WA Climate Assembly Monitoring Team

Dec. 2017 – 2020. Heal the Bay MPAWatch Community Science eDNA Project

April 2017 – 2020. Reef Check California Community Science Diver

Sept. 2015 – 2020. Bicycle Coalition at UCLA – LACBC Chapter co-president

Spring 2013 – Spring 2018. Student and Alumni Rep. to Advisory Panel on Investment Responsibility & Licensing, Chair of Human Rights Committee

2015 – 2016. Project Drawdown Writer - Wetland Restoration and Mgmt Chapter

Winter 2013 – June 2015. Student Representative to the Searsville Dam Advisory Committee

Journal Reviews

Nature Communications, Molecular Ecology Resources, Frontiers in Ecology and the Environment, Journal of Systematics and Evolution, Environmental DNA, Environmental Science and Technology Letters, Copeia