SHELLY A. WANAMAKER, Ph.D.

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Professional Preparation

University of Washington	Fisheries Genomics	Postdoctoral Fellow, 2018-2021
University of California San Diego	Biological Sciences	Ph.D., 2018
Simmons College	Biochemistry	B.S., 2010

Experience

2021- present Research Scientist, Gloucester Marine Genomics Institute, Gloucester, MA

- Develop and validate CRISPR/Cas-based molecular diagnostics including isothermal amplification-assisted and amplification-free methods for nucleic acid detection of aquatic animal diseases
- Lead collaborations with industry partners (New England Biolabs and Sherlock) and government agencies (MA Division of Marine Fisheries and Florida Wildlife Research Institute)

2018-2021 Postdoctoral Fellow, University of Washington School of Aquatic and Fishery Sciences, Roberts Lab

- Assess epigenetic and transcriptomic variation and identify molecular markers that differ within Atlantic salmon and Pacific geoduck clam populations exposed to different environmental conditions through analyzing and interpreting genome-wide methylation bisulfite sequencing and RNA-seq data; collaboration with the Gallardo-Escaraté lab at the Universidad de Concepción
- Assess effects of altered seawater pH on reproductive development through developing a qPCR assay on non-lethal, temporally collected hemolymph samples in adult Pacific geoduck, and on larval developmental physiology (respiration rate, growth, survival, genome-wide methylation); collaboration with Jamestown-S'klallam Tribe Pt. Whitney Hatchery
- Identify and interpret temporal proteome variation in metamorphosing Pacific oysters exposed to different temperatures; collaboration with Taylor Shellfish Hatchery, Quilcene, WA
- Assess physiological response of pteropods to low oxygen and pH conditions through survival, development, lipidomics, and metabolomics analysis; collaboration with NOAA NWFSC
- Lead cooperative field, hatchery, and laboratory research in collaboration with Jamestown-S'klallam Tribe Fisheries Division, Taylor Shellfish Hatchery, and NOAA NWFSC Conservation Biology Division

2017-2018 NSF Graduate Research Internship Program Fellow, NOAA Northwest Fisheries Science Center, Conservation Biology Division, Genetics Section

- Assess physiological impacts of ocean acidification on Dungeness crabs through metabolomics analysis
- Develop and implement bioinformatics pipelines for analyzing complex metabolomics data sets from differentially conditioned Dungeness crabs
- Run time-course high throughput laboratory ocean acidification exposure experiments on Dungeness crab larvae
- Field collection and laboratory rearing of Dungeness crab larvae, juveniles, and adults

2013-2018 Graduate Student Researcher, Salk Institute for Biological Studies, Ecker Lab
2012-2013 Research Assistant II, Salk Institute for Biological Studies, Ecker Lab
2011-2012 Research Assistant I, Salk Institute for Biological Studies, Ecker Lab

- Developed DNA sequencing-based assay (CrY2H-seq) for *en masse* protein-protein interaction mapping and coded a custom bioinformatics pipeline to identify and quantify interactions
- Validated protein-protein interaction networks using network simulation and model prediction, data integration, and functional analysis approaches to evaluate CrY2H-seq assay performance
- Generated comprehensive protein-protein interactome for *Arabidopsis thaliana* by high throughput engineering of thousands of expression clones and using CrY2H-seq to iteratively screen billions of interactions *en masse*

2010-2011 Research Technician I, Dana Farber Cancer Institute, Center for Cancer Systems Biology, Vidal Lab
2010 Research Trainee, Dana Farber Cancer Institute, Center for Cancer Systems Biology, Vidal Lab

- Generated comprehensive human protein-protein interactome using high throughput yeast two-hybrid screening
- Validated protein-protein interaction networks using a high throughput well-nucleic-acid-programmable-protein-array assay that I developed and a protein complementation assay
- Generated protein-protein interactome map using high throughput yeast two-hybrid to screen autism genes and isoforms against the human ORFeome
- Constructed yeast expression clone libraries using high throughput gateway cloning for yeast two-hybrid screening of Kaposi's Sarcoma and Epstein-Barr viral genes against the human ORFeome

2009-2010 Undergraduate Student Researcher, Simmons College, Roecklein-Canfield Lab

- Developed and optimized a GST immunoprecipitation assay to isolate Epstein-Barr viral proteins. Honors Thesis: The effectiveness of the GST fusion system for isolating Epstein-Barr viral thymidine kinase, a potential target for antiviral antitumor therapies

Grants and Fellowships

2020 $10,000 USDA NRSP8 Small Funding Award
2020 $1,000 USDA NRSP8 PAGXXVIII Aquaculture Travel Award
2019 $7,000 UW Data Science Postdoctoral Fellowship
2019 $1,000 UW College of the Environment Travel Award
2017 $5,000 NSF GRIP Fellowship with NOAA Northwest Fisheries Science Center
2016 $300,000 NSF PAPM EAGER: Using novel, clone-free sequencing methods to discover host-microbe protein-protein interactions (Co-authors: Shelly Trigg, Paulo Teixeira, and Co-PIs Jeff Dangl and Joseph Ecker
2014 $138,000 NSF Graduate Research Fellowship

Publications

SR Major, MJ Harke, R Cruz-Flores, AK Dhar, AG Bodnar, and Shelly A. Trigg. (2022) Rapid detection of DNA and RNA shrimp viruses using CRISPR-based diagnostics. ***Applied and Environmental Microbiology.*** *In review*. Preprint: https://doi.org/10.1101/2022.12.14.520450

HM Putnam*, Shelly A. Trigg*, [9 others], and SB Roberts. (2022) Dynamic DNA methylation contributes to carryover effects and beneficial acclimatization in geoduck clams. ***Proceedings of the Royal Society B***. *In review*. Preprint: https://doi.org/10.1101/2022.06.24.497506. * indicates co-first authorship

SJ Gurr, Shelly A. Trigg, B Vadopalas, SB Roberts, and HM Putnam. (2021) Acclimatory gene expression of primed clams enhances robustness to elevated pCO2. ***Molecular Ecology***. https://doi.org/10.1111/mec.16644

ET Montaño, [37 others], Shelly A. Trigg, K Pogliano, and J Pogliano. (2022) Isolation and characterization of *Streptomyces* bacteriophages and *Streptomyces* strains encoding biosynthetic arsenals. ***PLoS ONE*** 17(1): e0262354. https://doi.org/10.1371/journal.pone.0262354

Shelly A. Trigg*, YR Venkataraman*, MR Gavery, SB Roberts, D Bhattacharya, A Downey-Wall, JM Eirin-Lopez, KM Johnson, KE Lotterhos, JR Puritz, and HM Putnam. (2021) Invertebrate methylomes provide insight into mechanisms of environmental tolerance and reveal methodological biases. ***Molecular Ecology Resources***. https://doi.org/10.1111/1755-0998.13542. * indicates co-first authorship

SJ Gurr, Shelly A. Trigg, B Vadopalas, SB Roberts, and HM Putnam. (2021) Repeat exposure to hypercapnic seawater modifies growth and oxidative status in a tolerant burrowing clam. ***Journal of Experimental Biology.*** 224(13): jeb233932. https://doi.org/10.1242/jeb.233932

BC Willige, M Zander, CY Yoo, A Phan, RM Garza, Shelly A. Trigg, Y He, JR Nery, H Chen, M Chen, JR Ecker, and J Chory. (2021) Phytochrome-interacting factors trigger environmentally responsive chromatin dynamics in plants. ***Nature Genetics***. 53:955-961. https://doi.org/10.1038/s41588-021-00882-3

Shelly A. Trigg, KM Mitchell, R Elliot, B Eudeline, B Vadopalas, EB Timmins-Schiffman, SB Roberts. (2020) Temporal proteomic profiling reveals insight into critical developmental processes and temperature-influenced physiological response differences in a bivalve mollusc. ***BMC Genomics.*** https://doi.org/10.1186/s12864-02007127-3

Shelly A. Trigg, P McElhany, M Maher, D Perez, DS Busch, and KM Nichols. (2019) Uncovering mechanisms of global ocean change effects on Dungeness crab (*Cancer magister*) through metabolomics analysis. ***Scientific Reports***. https://doi.org/10.1101/574798

West Coast National Marine Sanctuaries Education Team and NOAA Northwest Fisheries Science Center (Shelly A. Trigg as lead author). (2018) Ocean Acidification Communication Toolkit: Dungeness Crab Case Study. *NOAA Ocean Acidification Program*. https://sanctuaries.noaa.gov/education/crab-toolkit.html

Shelly A. Trigg. (2018) High-resolution molecular networks from novel 'omics' approaches elucidate survival strategies in organisms from land to sea. Ph.D. dissertation. *UC San Diego*. ProQuest ID: Trigg_ucsd_0033D_17575

Shelly A. Trigg, RM Garza, A MacWilliams, JR Nery, A Bartlett, R Castanon, A Goubil, J Feeney, R O'Malley, SC Huang, ZZ Zhang, M Galli, and JR Ecker (2017) CrY2H-seq: a massively multiplexed assay for deep coverage interactome mapping. ***Nature Methods*** (cover art selected). 14(8):819-825. https://doi.org/10.1038/nmeth.4343

Shelly A. Trigg, RM Garza, A MacWilliams, JR Nery, A Bartlett, R Castanon, A Goubil, J Feeney, R O'Malley, SC Huang, ZZ Zhang, M Galli, and JR Ecker (2017) CrY2H-seq interactome screening. ***Protocol Exchange***. doi:10.1038/protex.2017.058

X Yang, [15 others], Shelly A. Trigg, [20 others], and M Vidal. (2016) Widespread expansion of protein interaction capabilities by alternative splicing. ***Cell***. 164(4):805-817. https://doi.org/10.1016/j.cell.2016.01.029

T Rolland, [53 others], Shelly A. Trigg, [14 others], and M Vidal. (2014) A proteome-scale map of the human interactome network. ***Cell***. 159(5):1212-1226. https://doi.org/10.1016/j.cell.2014.10.050

R Corominas, [8 others], Shelly A. Trigg, [18 others], M Vidal, and LM Iakoucheva. (2014) Protein interaction network of alternatively spliced isoforms from brain links genetic risk factors for autism. ***Nature communications***. 5:3650. https://doi.org/10.1038/ncomms4650

Rozenblatt-Rosen, [36 others], Shelly Wanamaker, [13 others], and M Vidal. (2012) Interpreting cancer genomes using systematic host network perturbations by tumour virus proteins. ***Nature***. 487(7408):491-495. https://doi.org/10.1038/nature11288

Synergistic Activities

Leadership

- 2022 – present Communications Committee Co-chair for AWIS Boston
- 2022 Association for Women In Science Boston Leadership Program (16 classroom hours)
- 2022 – present GMGI Staff Council Research team representative
- Co- host and organizer of 2022 CEABiGR workshop for Comparative Epigenomics Analysis across Bivalves Genomic Resources
- Trained, supervised, and managed 4 research assistants, 2 technicians, and 8 students from diverse backgrounds
- Mentored 2 biotech vocational academy student, 2 graduate students at UC San Diego, 2 undergraduate and 3 graduate students at University of Washington, and 1 undergraduate student at NOAA NWFSC

Science Education Outreach

- Developer and webinar presenter of 2018 ocean acidification multimedia educational toolkit for National Marine Sanctuaries
- Co-developer of educational films for NOAA's "Dungeness crabs in changing waters" (2019), Salk Institute Plant Biology (2016), AAAS New Frontiers in Science curriculum (2014-2017)
- Organizer and presenter of public science demonstrations for 2019 UW SAFS Open House, 2013 ACS Chemistry Expo (San Diego) and Greater San Diego Science Festival Expo Day (2013, 2014)
- Host and organizer of 2014 AWIS San Diego undergraduate career panel
- Panelist for 2022 Boston Harbor Ecology Network's Career Panel

- Judge for student presentations at 2022 WAS Aquaculture Triennial Conference, UC San Diego Undergraduate Biology Showcase (2015, 2016), Greater San Diego Science Festival (2013, 2014)

Academic Service

- Host and organizer of 2020 website design Workshop "Increase Your Visibility: Crafting Professional Websites Using GitHub" (SAFS University of Washington)
- Teaching Assistant for 2020
- Completed 2017 Evidence-Based Teaching and Learning in Biological Sciences course (UC San Diego)
- Completed 2016 Introduction to College Biology Education course (UC San Diego)
- Head Instructional Assistant for 2017 Regulation of Eukaryotic Gene Expression undergraduate course (UC San Diego)
- Recipient of 2016 UC San Diego Biological Sciences Excellence in Teaching Award
- Instructional Assistant for 2016 Genomics Research Initiative Lab and 2014 Biochemical Techniques Lab undergraduate courses (UC San Diego)
- Teaching Assistant for General Chemistry, Organic Chemistry I and II, and Biochemistry II undergraduate courses 2008-2010 (Simmons College)

Committee Participation

- 2022- Association for Women In Science (Massachusetts) Communications Committee Co-Chair
- 2018-2022 UW SAFS Communications Committee Postdoctoral representative
- 2015-2016 UC San Diego Biology Department Peer Mentorship Committee Co-Chair
- 2015-2016 UC San Diego Graduate Seminar Series Committee Co-Chair
- 2014-2016 Salk Institute Partnerships in Science Committee member
- 2014-2016 UC San Diego STEM Education and Diversity Committee member
- 2012-2016 Association for Women in Science (San Diego) Outreach Committee member

Technical skills and training

Molecular and Cellular Biology

CRISPR/Cas diagnostic assay development, Illumina and Oxford Nanopore DNA sequencing, whole genome, RNAseq and Bisulfite sequencing library preparation, isothermal amplification, PCR, qPCR, oligo design, ELISA, immuno-blotting and precipitation, recombinant DNA techniques, nucleic acid and protein purification, cell culture and transfection, histological techniques

Marine Biology

Respirometry measurement with PreSens equipment, flow-through animal rearing systems design, construction and implementation, seawater chemistry analysis

Laboratory Automation

Liquid handling robots, plate readers, titrators

Computation

Genomics, epigenomics, proteomics, and metabolomics data analysis, regression analysis, multivariate statistical methods, statistical computing and simulation, data reduction and integration, molecular network analysis (Cytoscape, Qiagen IPA), Linux environment familiarity, Bash and Python/Jupyter scripting, R, data management, supercomputing, GitHub (https://github.com/shellytrigg), Slack, Google Suite applications, Microsoft Office applications

Training

2018 LC-MS Data Processing and Statistics in Metabolomics course (UC Davis WCMC), 2016 Visiting Scientist Training Program in Network Analysis (Broad Institute), 2015 NSF Graduate Data Science Workshop (University of Washington), 2015 Biostatistics Refresher course (UC San Diego), 2013-2014 Software Carpentry courses (Salk), 2012 Tecan EVO Training course