VANESSA I. GUERRA, PHD

Evolutionary & Computational Biologist

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Passionate research scientist with experience in molecular biology, genomics, and reproductive research. Author of 6 manuscripts for peer-reviewed journals including 2 first-author papers

PROFESSIONAL PROFILE

- **Expertise in Sanger sequencing, cloning, primer design, molecular protocol adaptations, and NGS library construction and analysis**
- **Recognized for ability to effectively communicate scientific and technical processes** to others and provides solutions to multi-dimensional problems at the interface of bioinformatics and biology
- **Designs and employs ad hoc tools in Perl, Unix, and R** for analysis and display of complex data sets

PROFESSIONAL EXPERIENCE

Life and Environmental Sciences, University of California Merced (Merced, CA) 2021 – Pres.

Postdoctoral Scholar

Leading a multi-species genomic analyses to better understand their susceptibility to environmental change.

- Coordinated a multi-institutional marine networks (MariNet) consortium
- Organized a multispecies collection effort along the coast of California

Simon Fraser University & Smithsonian (Burnaby, BC and Washington, DC) 2015 – 2020

Research Assistant | Visiting Research Fellow

Analyzed reproductive genes evolution using genome and transcriptome analysis (assemblies, SNP calling, annotation, differential expression, and selection analysis)

- Develop computational pipeline for various NGS analysis (Genomic and Transcriptomic)
- Created Perl, Unix shell, and R scripts to read in protein data from multiple files and put them into a database
- Worked closely with Cluster team and other bioinformaticians

Wake Forest University 2014 – 2015

Laboratory Manager

Developed next generation sequencing (NGS) protocols and led NGS workshops. Trained undergraduate and graduate students in molecular biology.

- Developed best practice documentation for NGS analysis and laboratory techniques to enable transparent and reproducible data analysis
- Collaborated with research scientists in designing and implementing NGS solutions and analyzing omics data
- Processed nucleic acid isolation and quantification, PCR amplification, and DNA and RNA library preparation

San Francisco State University 2010 – 2014

Graduate Student

Described genetic variation in a reproductive gene (cloning, Sanger sequencing, primer optimization, genome analysis)

- Field collection and taxonomical identification of marine invertebrates
- Conducted and supervise wet-lab research in the areas of cell culture and molecular biology
- Developed UNIX shell, PERL, and AWK program to process NGS data

Smithsonian Environmental Research Center 2009 – 2010

Intern

Managed a new marine invasion

- Coordinated a large effort to identify and remove invasive species
- Identified and processed the data collection of marine invertebrates and algae

TEACHING EXPERIENCE

- Marine Genomics, University of California, Davis. Lectured Unix classes 2021
- Evolutionary Genomics Laboratory Consultant, Simon Fraser University. Led laboratory exercises for genome and transcriptome analysis (Unix, cluster use, assemblies, SNP calling, trees, differential expression) 2018
- Software Carpentries Instructor, Simon Fraser University. Lectured Unix, GitHub, and R classes 2018
- Pop. Genetics TA, Simon Fraser University. Prepared and led tutorials and lectures 2015
- Microbiology Open Lab. Supervisor, San Francisco State University. Supervised wet lab practices 2011-2013

PUBLICATIONS

- Hart, M.W, Guerra, V.I., Byrne, M., Allen, J.D. (2021). "Cloning and selfing affect population genetic variation in simulations of outcrossing, sexual sea stars." *Accepted in Biological Bulletin*
- Guerra, V.I., Haynes, G., Byrne M., Hart, M.W. (2020). "Selection on genes associated with the evolution of divergent life histories: Gamete recognition or something else?" *Accepted in Evolution and Development*
- Hart, M.W., Guerra, V.I., Byrne, M., & Puritz, J. (2020). "Genomic data improve coalescent inference across a range of demographic parameters and life-histories". *Molecular Ecology in review*
- Guerra, V.I., Haynes, G., Byrne, M., Yasuda, N., Adachi S., Nakamura, M., Nakachi, S., and Hart, M.W. "Nonspecific expression of fertilization genes in the crown-of-thorns *Acanthaster* cf. *solaris*: Unexpected evidence of hermaphroditism in a coral reef predator." *Molecular Ecology* 29, no. 2 (2020): 363-379
- Hart M.W., Stover D.A., Guerra V.I., Mozaffari S.V., Ober C., Mugal C.F., Kaj I. "Positive selection on human gamete-recognition genes". *PeerJ* 6 (2018): e4259
- Hart M.W., Guerra V.I. "Finding genes and lineages under selection in speciation". *Molecular Ecology* 26, no. 14 (2017): 3587-3590

OUTREACH

- Volunteer tutor, Latino Student Fund 2020
- Co-founder, SFU-Omics Group, Simon Fraser University 2017 – 2019

GRANTS & FELLOWSHIPS

- Simon Fraser University: Graduate Fellowship 2018, 2020
- The Society for Integrative and Comparative Biology, Best practices for using NGS-based datasets (NSF-funded): Participation Grant 2018 – 2019
- University of Washington, Friday Harbor Laboratory: Robert L. Fernald Endowed Scholarship & Larry McEdward Memorial Fund 2017
- Simon Fraser University: Hogg Memorial Grad Scholarship 2017
- Simon Fraser University: Glen Geen Scholarship in Marine Biology 2016
- Red de Genética de la Conservación: Instructional and Travel Grant 2012
- San Francisco State University: Instructionally Related Research Award 2012
- Smithsonian Tropical Research Institute and Pan-American Advanced Studies Institute (NSF-funded): Instructional and Travel Grant 2011
- San Francisco State University (NSF-funded): Training in Ecology and Evolution Fellowship 2010 – 2012

EDUCATION

DOCTOR OF PHILOSOPHY (PHD), BIOLOGY – SIMON FRASER UNIVERSITY, BURNABY 2020
Thesis title: Evolution of mating systems and reproductive genes in sea stars

MASTER OF ARTS (MA), BIOLOGY – SAN FRANCISCO STATE UNIVERSITY, SAN FRANCISCO 2014
Concentration in Ecology, Evolution, and Conservation Biology
Thesis title: Population variation at a self-incompatibility locus in a marine invasive species

BACHELOR OF SCIENCE (BS), BIOLOGY – HUMBOLDT STATE UNIVERSITY, ARCATA 2010