VANESSA I. GUERRA, PHD

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COMPUTATIONAL BIOLOGIST

Evolutionary & computational biologist with progressive experience in molecular biology, genomics, reproductive research—passionate about analyzing multi-omic data to drive scientific discovery, advancements in startup environment. *PhD, Biology,* Simon Fraser University; *MS, Biology,* SFSU.

HIGHLIGHTS:

- **Strong Scientific Background:** Expert in Sanger sequencing, cloning, primer design, molecular protocol adaptations—including NGS (next-generation sequencing) library construction & analysis, in both genomics, transcriptomics.
- **Bioinformatics Experience:** Solid generalist; helped teach bioinformatics workshops at Wake Forest University, Simon Fraser University [SFU], UC Davis); write programs with Perl, R, Python, Unix / AWK; experience handling, management, and storage of large-scale sequencing data; experience querying public databases; leverage bioinformatics tools to assess evolution of reproductive genes, including those of humans.
- **Novel Scientific Research:** Recently published paper on *Acanthaster* **(see Addendum),** developing bioinformatics pipeline to process RNA-seq data / transcriptomic data. Discovered previously-undescribed polymorphic reproductive genes by detecting novel mode of reproduction (hermaphrodite)—illustrating need for using RNA-seq data.
- **Extensive Wet-Lab Experience:** Served as lab manager, performing both wet lab and dry lab work; attended course at Duke University to learn how to prepare NGS libraries. Experienced in cloning, PCR, cycle sequencing, nucleotide isolation (DNA / RNA extractions), NGS library preparation (RNA, DNA); willing to learn qPCR or CRISP on own time.
- **Natural Leader:** Co-founded omics club at SFU (google.com/sfuomics) to bring together many Omics researchers & students—that were hard-to-locate, operating in myriad disparate departments, including Computing Science, Biomedical Physiology & Kinesiology, Math.
- **Highly-Regarded Researcher:** Spent several years as guest at Smithsonian Institution performing PhD work; have authored (6) manuscripts for peer-reviewed journals, including (2) first-author papers.
- **Persuasive Communicator:** Recognized for seamlessly communicating scientific & technical processes to nontechnical stakeholders while solving complex problems at intersection of bioinformatics, biology. Bilingual: fluent English, Spanish.
- **Data Science:** Design and employ *ad hoc* tools in Perl, Unix, R for analyzing / displaying complex datasets.

SIGNATURE STRENGTHS:

Biology • Genomics • Customer Service • Balancing Competing Priorities • Matrixed Environments • Multi-omic Data (NGS, RNA seq, GWAS) • Coding • Data Science / Management • Developing Computational Pipelines • Leading Multiple Concurrent Projects • Collaborating with / Working as Wet & Dry Lab Scientists • RNA seq / GWAS Data • Research Scientist

PROFESSIONAL EXPERIENCE

Visiting Research Fellow, **Smithsonian's National Museum of Natural History.** Washington, DC; 2018 – present
Studied reproductive adaptive genes in sea stars.

Postdoctoral Scholar, Life & Environmental Sciences, **University of California Merced;** CA; January 2021 – June 2021
Leading multi-species genomic analyses to better understand susceptibility to environmental change. Led multi-institutional marine networks (MariNet) consortium.   Organize, lead multispecies collection initiative on California coast.

Intern, **Smithsonian Conservation Biology Institute's Center for Species Survival;** Washington, DC; 2019 – 2020
Characterized evolution of gamete recognition genes of carnivores.

Research Asst., **Simon Fraser Univ. & Smithsonian;** Burnaby, BC / Wash, DC; 2015-20
Analyzed reproductive adaptive genes in sea stars and chordates using genome and transcriptome analysis (assemblies, SNP calling, annotation, differential expression, selection analysis, etc.). Worked with Cluster team, bioinformaticians.
- Developed computational pipeline for numerous NGS analysis (genomic, transcriptomic).
- Created Perl, Unix shell, R scripts to read protein data from multiple files—and assign, enter into database.

Laboratory Manager, **Wake Forest University;** Winston-Salem, NC; 2014 – 2015
Developed NGS protocols for marine science, led workshops. Trained undergraduate / graduate students in molecular biology, wet-lab work, Equipment maintenance. Identified parasitic copepods from rockfish using DNA barcoding.
- Enabled transparent, reproducible data analysis by devising best practice documentation for NGS analysis.
- Co-designed and launched NGS solutions, analyzed omics data in partnership with research scientists.
- Processed nucleic acid isolation and quantification, PCR amplification, prepared DNA / RNA library.

Graduate Student, **San Francisco State University;** CA; 2010 – 2014
Described genetic variation in reproductive gene influencing population genetic diversity in marine invasive species, *Ciona robusta*. (via cloning, Sanger sequencing, primer optimization, genome analysis). Performed field collection and taxonomical identification of marine invertebrates; led wet-lab research in cell culture, molecular biology.
- Developed Unix shell, Perl, AWK program to process NGS data.

Intern, **Smithsonian Environmental Research Center;** San Francisco, CA; 2009 – 2010
Managed new marine invasion: led initiative to identify, remove species. Collected, analyzed data.

Junior Specialist, **University of California Davis;** 2010
Led volunteer initiative to identify and remove invasive species, *Undaria pinnatifida;* performed data analysis.

Marine Laboratory Technician, **Humboldt State University Marine Laboratory;** Arcata, CA; 2008 – 2009

TEACHING EXPERIENCE

Instructor, Marine Genomics, **University of California Davis;** 2021

Evolutionary Genomics Laboratory Consultant, **Simon Fraser University;** 2018
Led laboratory exercises for genome transcriptome analysis (Unix, cluster use, assemblies, SNP calling, trees, differential expression, general statistical tests).

Invertebrate Biology Teaching Assistant (TA), **Simon Fraser University;** 2016 – 2018
Taught characteristics and functions of marine invertebrates.

Software Carpentries Instructor, **Simon Fraser University Library;** 2018
Led and assisted Unix, GitHub, R classes.

Population Genetics TA, **Simon Fraser University;** CA; 2015
Prepared and led tutorials and lectures. Prepared and led tutorials, guest lecturer.

Microbiology Open Lab Supervisor, **San Francisco State University;** CA; 2011 – 2013
Supervised wet lab practices, trained students in laboratory benchwork, performed equipment maintenance.

Marine Invertebrates TA, **San Francisco State University;** CA; 2010
Helped identify marine invertebrates.

EDUCATION

PhD, Biology, **Simon Fraser University;** Burnaby, British Columbia**,** 2020
Thesis: Evolution of mating systems and reproductive genes in sea stars

MA, Biology, Concentration: Ecology, Evolution & Conservation Biology, **San Francisco State University;** CA; 2014
Thesis: Population variation at a self-incompatibility locus in a marine invasive species

BS, Biology, **Humboldt State University;** Arcata, CA; 2010

SPECIALIZED COURSES

Workshop, "Best practices for using NGS-based datasets to determine statistically robust evidence of positive selection & convergent evolution of polar organisms," **The Society for Integrative & Comparative Biology;** 2018-2019
Data Carpentry Instructor, **The Carpentries;** 2018
Comparative Invertebrate Embryology, **University of Washington, Friday Harbor Laboratories;** 2017
Comparative Genomics, **Simon Fraser University;** 2015
Benchwork Training: NGS Techniques, **Duke University Marine Laboratory;** 2014
Genome Evolution, Genome Annotation, **San Francisco State University;** 2013
Genetics for Conservation, **Red de Genética de la Conservación;** 2012
Advanced Ascidian Taxonomy, **Smithsonian Tropical Research Institute;** 2011
NAUI SCUBA Instructor course, **University of California, Santa Cruz;** 2010