Adriana González Fernández

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Professional Preparation

- Doctor in Philosophy in Integrative Biology with a Concentration in Environmental Microbiology
  University of South Florida (Tampa, FL) – Dec 2022
- Bachelor's degree in Biology with Emphasis in Biotechnology
  Universidad Nacional (Heredia, Costa Rica) – May 2014

Professional Experience

Science and Research Director | *Miami Waterkeeper* | FL, USA
May 2024 – Present

I direct a multi-city water quality monitoring program with an annual budget of approximately $200K, expanding site coverage and improving data reliability to provide timely, science-based information that empowers public decision-making. I lead pollution response efforts by applying source tracking to identify contamination sources and serve as a liaison between affected residents and municipal officials. I develop and implement a comprehensive science strategy that aligns departmental research goals with organizational objectives and regional sustainability priorities. Managing a multidisciplinary science team—including a Science and Research Manager and technical staff—I coordinate efforts and conduct weekly progress reviews to ensure high-quality and timely deliverables. I collaborate with grant development teams to contribute to successful foundation funding by translating scientific insights into compelling narratives, while also co-authoring and submitting competitive federal and state grant proposals (e.g., EPA, FDEP) to support research growth and partnerships. In policy and regulatory settings, I provide technical leadership by offering expert input on water quality issues during stakeholder meetings, advisory panels, and public hearings. I translate complex scientific data into actionable reports, comment letters, and legal documents that advance environmental policy, advocacy, and litigation efforts. Additionally, I oversee rigorous data management and analysis processes, enforcing quality assurance protocols and performing advanced statistical analyses in R to integrate findings into grant reports, publications, and public communications.

Scientist | *Southern California Coastal Water Research Project* | CA, USA
Feb 2023 – May 2024

Advanced applied research on urban water quality and microbial contamination, co-authoring multiple peer-reviewed publications focused on stormwater pathogens, sewer exfiltration, and sanitation impacts. I led study design and developed Quality Assurance Project Plans (QAPPs) for laboratory work, including multi-laboratory method intercomparison studies, ensuring consistency and scientific rigor in emerging rapid molecular detection techniques. To strengthen local capacity, I provided hands-on training to municipal partners in rapid qPCR-based water quality monitoring methods, promoting technology transfer for real-time decision-making. I managed field logistics and conducted data analysis for sewer exfiltration studies, coordinating efforts among scientists, technicians, engineers, and municipal partners, with this work directly supporting peer-reviewed publications on urban fecal pollution. Leading and performing advanced statistical analyses on environmental microbiology and

water quality data, I generated actionable insights for watershed-scale management and regulatory evaluations, including revisions to shellfish harvesting standards. Serving as a scientific liaison, I translated complex environmental findings into policy-relevant insights to inform dischargers, regulators, and policymakers, supporting evidence-based multi-agency decision-making. Additionally, I developed and communicated scientific results to regulators, policymakers, and stakeholders, reinforcing the role of science in regional water governance and environmental regulation, while compiling comprehensive technical reports documenting project milestones, microbial source tracking results, and practical recommendations for water quality improvement.

Researcher gained as Doctoral Graduate Research Assistant | *University of South Florida* | FL, USA
Aug 2017 – Dec 2022

Led an international water quality research project in Costa Rica, effectively managing multidisciplinary teams from U.S. universities and Costa Rican institutions to oversee fieldwork, data collection, and collaborative analysis. Authored multiple peer-reviewed publications focused on microbial contamination and waterborne pathogen risk, including quantitative microbial risk assessments to evaluate public health impacts. Utilized advanced multivariate statistical techniques to analyze water quality data, supporting pathogen characterization and risk evaluations. Communicated complex scientific results through presentations to local stakeholders and the Costa Rican Ministry of Health, facilitating evidence-based public health and environmental policies. Additionally, trained local scientists and technicians in virus detection methodologies, playing a key role in establishing Costa Rica's first coronavirus water monitoring program.

Water Quality Specialist | *Costa Rican Waterworks Institute (AyA)* | Tres Ríos, Costa Rica
June 2014 – June 2017

Supported the development and implementation of water quality policies, standards, and procedures for drinking water and sanitation systems, managing data and conducting comprehensive microbiological, chemical, and physical water analyses. Led sanitary inspections and water quality assessments while contributing to the laboratory's quality management system through documentation, procurement, and validation of new testing methods. Conducted national water quality surveillance involving fieldwork, laboratory analysis, and data interpretation to inform public health and environmental monitoring. Collaborated closely with community leaders and local stakeholders to strengthen water governance and expand sustainability initiatives, notably supporting the Ecological Blue Flag Program (PBAE) across Central America. Assisted in extending the PBAE in Honduras in partnership with the Honduras Institute of Tourism, promoting sustainable tourism through science-based environmental stewardship.

Intern | *Costa Rican Institute for Research and Teaching in Nutrition and Health (INCIENSA*) | Tres Ríos, Costa Rica
Jun 2013 – Jul 2013

Completed professional practice as a requirement for earning a bachelor's degree, during which I collaborated on the molecular characterization of genes linked to decreased ciprofloxacin sensitivity in a collection of Shigella spp. isolates from Costa Rica.

Peer Reviewed Articles

Steele, J., Zimmer-Faust, A., Clerkin, T. J., **Gonzalez- Fernández, A.**, Lowry, S., Blackwood, A., Raygoza, K., Langlois, K., Boehm, A., Noble, R., Griffith, J., & Schiff, K. (2025). Survey of pathogens and human fecal markers in stormwater across a highly populated urban region. Environmental Science: Processes & Impacts.
https://doi.org/10.1039/D4EM00578C

Steele, J. A., **González-Fernández, A.**, Griffith, J. F., McCargar, D. E., Wallace, S., & Schiff, K. (2025). Extrapolating empirical measurements of wastewater exfiltration from sanitary sewers to estimate watershed-scale fecal pollution loading in urban stormwater runoff. Front. Environ. Sci, 12, 1458153.
https://doi.org/10.3389/fenvs.2024.1458153

Griffith, J.F., Steele J. A., **González-Fernández A.**, Schiff K. (2025). Towards Quantifying Exfiltration from In Situ Sanitary Sewer Pipes. Environ. Sci, 12, 1458146.
https://doi.org/10.3389/fenvs.2024.1458146

Hinds, J.B., Garg, T., Hutmacher, S., Nguyen, A.; Zheng, Z., Griffith, J., Steele, J., **González-Fernández, A.**, & Schiff, K. (2024). Assessing the defecation practices of unsheltered individuals and their contributions to microbial water quality in an arid, urban watershed. Sci. Total Environ, 920, 170708.
https://doi.org/10.1016/j.scitotenv.2024.170708

González-Fernández A., Symonds E.M., Gallard-Gongora J.F., Mull B., Lukasik J.O., Rivera Navarro P., Badilla Aguilar A., Peraud J., Mora Alvarado D., Cantor A., Breitbart M., Cairns M.R., Harwood V.J. (2023). Risk of gastroenteritis from swimming at a wastewater-impacted tropical beach varies across localized scales. Appl Environ Microbiol, 89, 0103322.
https://doi.org/10.1128/aem.01033-22

González-Fernández, A., Symonds, E. M., Gallard-Gongora, J. F., Mull, B., Lukasik, J. O., Navarro, P. R., Aguilar, A. B., Peraud, J., Brown, M. L., Alvarado, D. M., Breitbart, M., Cairns, M. R., & Harwood, V. J. (2020). Relationships among microbial indicators of fecal pollution, microbial source tracking markers, and pathogens in Costa Rican coastal waters. Water Research, 188, 116507.
https://doi.org/10.1016/j.watres.2020.116507

Laureano-Rosario, A. E., Symonds, E. M., **González-Fernández, A.**, Lizano R., O. G., Mora Alvarado, D., Rivera Navarro, P., Badilla-Aguilar, A., Rueda-Roa, D., Otis, D. B., Harwood, V. J., Cairns, M. R., & Muller-Karger, F. E. (2021). The relationship between environmental parameters and microbial water quality at two Costa Rican beaches from 2002 to 2017. Marine Pollution Bulletin, 163, 111957.
https://doi.org/10.1016/j.marpolbul.2020.111957

Conferences, talks and panels

A. González-Fernández (participant). State of the City Round Table Discussion. River Oaks Civic Association, Fort Lauderdale, FL. May 2025.

A. González-Fernández (presenter). Safeguarding South Florida's Waters: Science, Advocacy, and Community Action. Lauderdale Isles Water Management District Meeting. Mar 2024.

A. González-Fernández (presenter). Safeguarding South Florida's Waters: Science, Advocacy, and Community Action. Lauderdale Isles Water Management District Meeting. Mar 2024.

A. González-Fernández (presenter). Impact of Storms on Fecal Indicator Bacteria Levels in key Biscayne. Citizen Science Project's Lunch & Learn: Panel Discussion on Key Biscayne Storms and Water Quality. Sep 2024.

A. González-Fernández (presenter). Estimating Exfiltration Loading from Human Sources in the San Diego River. Technical Review Committee Meeting – Investigative Order No. R9-2019-0014. Apr 2024.

A. González-Fernández (presenter). Effectiveness of the Shellfish Standard in Newport Bay. Southern California Coastal Water Research Project. Feb 2024.

A. González-Fernández (presenter). Relationships between indicators and pathogens in shellfish and water. SCCWRP 9th Biennial Symposium. Southern California Coastal Water Research Project. May 2023.

A. González-Fernández (presenter) & A. Cantor (presenter). Preliminary results of the MERA Investigation. Remote presentation to share results with Costa Rican waterworks institute (Instituto Costarricense de Acueductos y Alcantarillados). Feb 2022.

A. González-Fernández (presenter) & A. Cantor (presenter). Preliminary results of the MERA Investigation. Online Report back for collaborators in the National Water Quality Laboratory (Laboratorio Nacional de aguas) in Costa Rica. Apr 2022.

A. González-Fernández (presenter) & A. Cantor (presenter). Preliminary results of the MERA Investigation. Online Report back for Costa Rican Ministry of Health. Apr 2022.

A. González-Fernández (presenter). Monitoring water quality for recreational use: Beyond the traditional. Advanced Medical Bacteriology. University of Costa Rica. Dec 2021.

A. González-Fernández (presenter), J. Gallard-Góngora, D. Mora-Alvarado, P. Rivera Navarro, J.O. Lukasik, B. Mull, J. Peraud, E.M. Symonds, and V.J. Harwood. Fecal Indicator and Pathogen Analysis to Inform an Interdisciplinary Study of Water Quality and Human Health Risk in Costa Rica. Water Microbiology Conference, Chapel Hill, North Carolina, USA. May 2018.

A. González-Fernández (presenter), J. Gallard, E.M. Symonds, M. Breitbart, M.R. Cairns, V.J. Harwood. Precipitation influences human pathogens and MST markers in Costa Rica. UNC Water Microbiology Conference. Chapel Hill, NC. May 2019.

V.J. Harwood, M. Breitbart, M.R. Cairns, E.M. Symonds, J. Gallard-Góngora, **A. González-Fernández**, D. Mora Alvarado, P. Rivera-Navarro, J.O. Lukasik, B. Mull, G. Ulmer, and M. Brown. MERA - an Integrated Transdisciplinary Study of Water Quality and Human Health at a Tropical Beach. Virtual (US) National Recreational Water Quality Workshop. U.S. Environmental Protection Agency, April 2021.

Skills

- Multivariate statistical analysis
- Statistical analysis appropriate for left censored data
- Proficiency using R Studio
- Scientific writing
- Analysis
- Cross-functional collaborator
- Oral communication
- Organization
- Critical thinking
- Problem-solving
- Time management
- Written communication
- Training new personnel in laboratory procedures
- Project management, inventory of supplies, equipment maintenance and logistics
- Defined Substrate Technology (IDEXX Colilert® and Enterolert®)
- EPA Method 1600 (Membrane Filter Test Method for Enterococci in Water)
- EPA Method 1604 (Total Coliforms and *Escherichia coli* in water by membrane filtration using a simultaneous detection technique)
- EPA Method 1611.1 (qPCR Method for Enterococci in Water)
- Field ultra-hollow fiber filtration techniques
- Nucleic acid extraction and purification
- Real time qPCR and RT-qPCR for source tracking markers and pathogens
- Turbidity measurement, temperature, conductivity, dissolved oxygen and pH measurement using YSI Plus Multiprobe
- Gel electrophoresis
- Fluent in English
- Native in Spanish
- Microsoft Office packages