James Ferrare

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Education

Stanford University | *Stanford, California* 2020 – Present
PhD in Biophysics
Advisor: Benjamin Good
Thesis: Evolutionary dynamics of large adapting populations

Tulane University | *New Orleans, Louisiana* 2017 – 2018
M.Sc. in Physics

Tulane University | *New Orleans, Louisiana* 2013 – 2017
B.S. in Physics, Mathematics, and International Development
Thesis: Analyzing the efficacy of chronic disease programs in Haiti

Research Experience

Kavli Institute for Theoretical Physics | *Santa Barbara, California* Summer 2024
Student, Quantitative Biology School

- Collected, sequenced and analyzed Nanopore long-read data from soil bacteria and phage genomes.

National Institutes of Health | *Bethesda, Maryland* 2020 – 2022
Post-baccalaureate fellow, Single Molecule Biophysics Lab
Advisors: Keir Neuman and Jonathan Silver

- Modelled dynamics of fibrillar collagen proteolysis by matrix metalloproteinase 1 and 9 complexes.

Institute for Science and Technology | *Klosterneuberg, Austria* 2018 – 2019
Intern, Computational Neuroscience Lab
Advisors: Anna Andersson and Gašper Tkačik

- Investigated asymmetrically partitioning E. coli bacteria in stochastic antibiotic environments.

Institute for Science and Technology | *Okinawa, Japan* 2018 – 2019
Intern, Biological Complexity Lab
Advisors: Davide Chiuchiù and Simone Pigolotti

- Developed analytical error formula for DNA polymerization along arbitrary reaction coordinate.

Tulane University | *New Orleans, Louisiana* 2017 – 2018
Undergraduate researcher, Femtosecond and Terahertz Spectroscopy Lab
Advisor: Diyar Talbayev

- Fabricated nanostructures on InSb substrates via photolithography and electron beam deposition.

Tulane University and Partners In Development | *Port au Prince, Haiti* 2016 – 2018
Principal Investigator, Analyzing the Efficacy of Chronic Disease Programs in Haiti
Advisor: Elisabeth Gleckler

- Led two-year IRB-approved, longitudinal study of 750-patient chronic disease program in Haiti.
- Spent 1000+ volunteer hours interviewing 80 patients and healthcare workers, constructing electronic health record system, analyzing collected data, piloting telemedicine program and publishing 140-page report of findings.

Tulane University and La Fundación Paraguaya | *Asunción, Paraguay* 2017 – 2018
Undergraduate researcher, Innovative Energy Solutions In Paraguay
Advisor: Colin Crawford

- Fabricated charcoal from agricultural waste using open-source, low-cost method from MIT.
- Wrote award-winning investigation of global energy poverty on multidimensional poverty metrics like MDI and HDI.

Professional Experience

Withum Smith and Brown, Data consultant | *Bethesda, Maryland* 2019 – 2020

- Developed data-integration tools and interactive financial reports using Power BI and Python.

Tulane Academic Success Center, Tutor | *Bethesda, Maryland* 2017 – 2018

- Tutored peers in calculus, physics, and Spanish

New Orleans Emergency Medical Services, Volunteer EMT | *New Orleans, Louisiana* 2015 – 2017

- Treated gun-shot wounds, heart attacks, overdoses, etc. on 12-hour volunteer ambulance shifts.

New Orleans Child Advocacy Center, Intern | *New Orleans, Louisiana* 2017 – 2018

- Conducted Kaplan-Meier survival analysis of child sexual abuse revictimization and codependency analysis of human trafficking risk factors among juvenile victims.

Covenant House, Intern | *New Orleans, Louisiana* Summer 2015

- Taught job skills-workshops to unhoused youth.

Partners In Development, Intern | *Port au Prince, Haiti* Summer 2012, 2013

- Conducted 50+ house studies, investigating efficacy of HydraAid community water filter distribution project.
- Developed curriculum for and taught intensive 5-week TOEFL English program to 100 students.

Publications

J. Ferrare, D. Wong and B. Good. "The dynamics of horizontal gene transfer in rapidly adapting populations." *In Prep*, 2025.
J. Ferrare and B. Good. "Evolution of evolvability in rapidly adapting populations." *Nature Ecology and Evolution*, 2024. Link.
Q. Li, **J. Ferrare**, J. Silver et al. "Cholesterol in the cargo membrane amplifies tau inhibition of kinesin-1-based transport." *Proceedings of the National Academy of Sciences*, 2023. Link.
D. Chiuchiù, **J. Ferrare**, and S. Pigolotti. "Assembly of heteropolymers via a network of reaction coordinates" *Physical Review E.*, 2019. Link

Fellowships and Awards

ARCS Pre-doctoral Fellowship, *Stanford University* 2024 - Present
SMBE Young Investigator Travel Award, *Stanford University* 2023
Gates-Cambridge Scholarship Finalist, *Tulane University* 2018
J. William Fulbright Scholarship, *Tulane University* 2018
George C. Marshall Scholarship Finalist, *Tulane University* 2017
George J. Mitchell Scholarship Finalist, *Tulane University* 2017
Student Leaders in Service Award, *Tulane University* 2016
McKeever Civic Engagement Scholarship, *Tulane University* 2016
Stone Award for Best Undergraduate Paper on a Latin American Topic, *Tulane University* 2016
Newcomb Tulane Taylor Summer Travel Grant, *Tulane University* 2014, 2016
TULASO Scholarship, *Tulane University* 2015
Stellar Tulane Academic Recognition Scholarship, *Tulane University* 2014

Conferences and Presentations

Society for Molecular Biology and Evolution (poster), *Puerto Vallarta, Mexico* 2024
Society for Molecular Biology and Evolution (poster), *Ferrara, Italy* 2023
American Physical Society (talk), *Las Vegas, Nevada* 2023
Bay Area Population Genetics (poster), *Berkeley, California* 2023
Bay Area Population Genetics (poster), *Stanford, California* 2022
Population, Evolutionary and Quantitative Genetics (poster), *Monterrey, California* 2022
Tulane Physics Research Colloquium (poster), *New Orleans, Louisiana* 2017
Birmingham Southern Latin American Studies Symposium (talk), *Birmingham, Alabama* 2016