Luke Evans

Flatiron Institute, Center for Computational Mathematics 162 5th Ave, New York, NY 10010 levans@flatironinstitute.org

Education

University of Maryland , College Park, MD Ph.D in Applied Mathematics, Emphasis in Scientific Computation <i>Advisors</i> : Maria Cameron and Pratyush Tiwary	May 2023
San Francisco State University, San Francisco, CA Master of Arts in Mathematics <i>Advisor</i> : Chun-Kit Lai	May 2017
Hendrix College, Conway, AR Bachelor of Arts in Mathematics Advisor: Lars Seme	May 2015
Honors and Awards	
 University of Maryland, College Park, MD Recipient of James C. Alexander Prize for Graduate Research Awarded to at most two recently graduated Ph.D. mathematics students per year for outstanding dissertation research. 	May 2024
Recipient of Ann G. Wylie Dissertation Fellowship Recipient of Outstanding Research Assistant Award	April 2022 January 2022
 San Francisco State University, San Francisco, CA Recipient of Graduate Student Distinguished Achievement Award Nominated by math department for significant contributions in research Sole mathematics recipient among College of Science and Engineering Recipient of Achievement Rewards for College Scientists Scholarchin (ARCS) 	May 2017
Hendrin College Conney AD	Julie 2010
Magna cum laude, graduation with distinction Recipient of Philip E. Parker Undergraduate Research Award	May 2015 May 2015
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Publications and Preprints

D. Wang, Y. Wang, L. Evans, P. Tiwary. From latent dynamics to meaningful representations, *Journal of Chemical Theory and Computation*, 1549-9168 (2024).

S. Sule, L. Evans, M. Cameron. Sharp error estimates for target measure diffusion maps with applications to the committor problem, submitted, arXiv:2312.14418 (2023).

L. Evans, M. Cameron, P. Tiwary. Computing committors in collective variables via Mahalanobis diffusion maps, *Applied and Computational Harmonic Analysis*, 64, 62-101 (2023).

L. Evans, M. Cameron, P. Tiwary. Computing committors via Mahalanobis diffusion maps with enhanced sampling data, *Journal of Chemical Physics*, 157, 214107 (2022).

L. Evans, C.K. Lai. Conjugate phase retrieval on \mathbb{C}^M by real vectors. Journal of Linear Algebra and its Applications, 587 (2019), 45 - 69.

C. Olson, L. Evans, N. Bayya, J. Edelberg. A comparison of encoding methods for automated design of optical architectures. *Proceedings of SPIE, Novel Optical Systems Design and Optimization* XXI, 107460J (2018).

Past Research Projects

University of Maryland, College Park, MD	I 0000 M 0000
 Graduate Researcher, advised by Maria Cameron and Pratyush Tiwary Computing committor functions and reactive currents on collective variable (CV) molecular simulation data using the Mahalanobis diffusion map algorithm (MMAP) Rigorously proving that the MMAP output converges to the generator of over- damped Langevin dynamics with position-dependent diffusion tensor Extending MMAP to data from biased molecular simulations 	January 2020 - May 2023
 AMSC 663-664: Advanced Scientific Computing Project, advised by Maria Cameron Combined manifold learning techniques with ensembles of local simulations to coarse- grain stochastic differential equations 	August 2018 - May 2019
 Naval Research Laboratory, Washington, D.C. Student Intern, Applied Optics, mentored by Colin Olson Developed evolutionary algorithms for design of optical systems 	May - August 2018
 San Francisco State University, San Francisco, CA Graduate Researcher, Dept. of Mathematics, advised by Chun-Kit Lai Developed the <i>conjugate phase retrieval problem</i>, proved results for complex vectors and Fourier phase retrieval of band-limited functions 	August 2016 - January 2018
 Lawrence Livermore National Laboratory, Livermore, CA Student Intern, Weapons and Complex Integration, mentored by Walt Nissen Applied locational optimization techniques to approximation of Voronoi tessellations for use in smoothed-particle hydrodynamics 	May - August 2016
 Hendrix College, Conway, AR Undergraduate Researcher, Dept. of Mathematics, advised by Lars Seme Created dynamical systems framework for the iterated Newton's method applied to complex-valued polynomials 	January - December 2014
Presentations	
Rare Events: Analysis, Numerics, and Applications , College Park, MD Talk, "Computing committors in collective variables using Mahalonobis diffusion maps"	February 2023
SIAM Washington-Baltimore Section Fall Meeting 2022, Ballston, VA Poster, "Computing committors with Mahalanobis diffusion maps"	November 2022
Mid-Atlantic Numerical Analysis Day, Temple University, Philadelphia, PA Talk, "Computing committors in collective variables using Mahalanobis diffusion maps"	October 2022
SIAM Annual Meeting , Virtual Talk, "Computing committors in collective variables using Mahalanobis diffusion maps"	July 2022
SIAM Conference on Uncertainty Quantification , Virtual Talk, "Computing committors in collective variables using Mahalanobis diffusion maps"	April 2022
American Physical Society March Meeting , Virtual Poster, "Data-driven committor approximation for anisotropic diffusions in collective variables."	iables" March 2021
SFSU Graduate Student Research Showcase, San Francisco, CA Poster, "Phase and Conjugate Phase Retrieval"	April 2017
MAA Mathfest, Portland, Oregon Talk, "Newton's Method in the complex plane"	July 2014

Academic Service

- Co-organizer for "Machine Learning Techniques for Quantifying Rare Events" minisymposium at 2022 SIAM Conference on Uncertainty Quantification, April 12-15, 2022
- Co-organizer for "Machine Learning For Rare Events" seminar at UMD Mathematics Department, Spring 2022, Website: https://www.math.umd.edu/~evansal/rit.html
- Co-organizer for "Norbert Wiener Center" seminar at UMD Mathematics Department, Fall 2018 Spring 2019
- Co-president of SIAM Chapter and Applied Math Graduate Student Council, University of Maryland, Fall 2021 Spring 2022
- Reviewer for Journal of Physical Chemistry, January-February 2024
- Reviewer for Journal of Physical Chemistry Letters, March 2023, May 2023
- Reviewer for Science China Mathematics, Spring 2020

Teaching, Mentoring and Administrative Experience

 University of Maryland, College Park, MD REU Teaching Assistant, "Machine learning methods for the study of rare events in stochastic systems" Mentored undergraduate researchers in conceptual understanding and python coding 	May 2022 - July 2022
for stochastic simulation and rare event sampling Teaching Assistant • T.A for calculus I, calculus II	August 2017 - May 2018
 San Francisco State University, San Francisco, CA Graduate Teaching Associate Instructor for college algebra T.A for calculus I 	August 2015 - May 2017
 Hendrix College, Conway, AR Tutor, Teaching Assistant Grader for calculus I Tutor for pre-calculus through calculus II 	August 2013 - May 2015