YUWEI BAO

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EDUCATION

Tulane University, New Orleans, LA *2020 - Expected in May 2025*
Ph.D. in Mathematics (GPA: 3.84/4.0)
Thesis advisor: Dr. Xiang Ji
McMurry University, Abilene, TX *2016 - 2020*
B.S. in Mathematics (Honors), Computer Science (Honors), (GPA: 3.77/4.0)

EXPERIENCE

Research Assistant, Tulane University, New Orleans, LA *2022 - Present*
Statistics; Data Science; Bioinformatics; Mathematical modeling; Machine Learning.
Teaching Assistant, Tulane University, New Orleans, LA *2020 - 2022*
Teach weekly recitations, host office hours, design and grade quizzes.

SKILLS

Programming Languages and Tools
Python (pandas, numpy, scipy, matplotlib, seaborn, statsmodels, scikit-learn), R (ggplot2, dplyr, tidyr),
Linux, Java, Matlab, SQL, HPC, Git
Coursera certificates
IBM Data Science Specialization; Python for Genomic Data Science; Machine Learning with Python

PROJECTS

Bayesian Inferences on Divergence Time Estimation, (Java, R, HPC) *2022 - Present*

- Construct Bayesian non-parametric prior for phylogenetic tree on high-dimensional data.

- Estimate effective population size in population genetics by Bayesian inference.

- Prove properties for Hamiltonian Monte Carlo (HMC) sampling with reflection construction.

- Examine computation efficiency improvements and infer phylogeny using published viral data.

- Integrate advances into software BEAST to serve statistics and infectious disease communities.

Bulk DNA Data Analysis for Cancer Evolution, (Python, R, Linux, HPC) *2022 - Present*

- Collaborate with Tulane biologists in Louisiana Cancer Research Center using Drosophila model.

- Work with building multiple pipelines to use bioinformatic tools to discover somatic short variants,
structural variants, and copy number variations using Whole-Genome sequencing Bulk DNA data.

- Analyze how different control samples contribute to filtering out background mutations for tumors.

- Analyze how gender, lineage, and generations affect mutations, genes, and tumor growth.

Models the Reconfigurable Flow Networks, (Matlab) *Summer 2021*
Model and simulate erosion, deposition, filtration, and growth by non-dimensionalization computations
using Stokes, advection-diffusion, and Navier-Cauchy equations with elasticity structure.

Covid-19 Multi-compartmental Model, (Matlab, Python) *2020 - 2021*
Create a framework for modeling the impact of behavior changes, testing, and vaccinations on the
spread of Covid-19 through ordinary differential equations with an emphasis on reproductive numbers.

RESEARCH PRESENTATIONS

Evolution Meeting, Albuquerque, NM   *6/21/2023*
Coalescent Bayesian tree prior

Scientific Computing Around Louisiana, New Orleans, LA   *3/10/2023*
Smooth Skygrid: Bayesian coalescent-based inference of population dynamics

Math for All in Nola, New Orleans, LA   *2/25/2023*
Bayesian coalescent-based model for inferring population dynamics

LA ASA Chapter Meeting, Online   *11/18/2023*
Smooth coalescent prior for scalable Bayesian phylogenetic demographic inference

Tulane Math Graduate Student Colloquium, New Orleans, LA   *3/15/2022*
Likelihood calculations on a phylogenetic tree

AWARDS AND SCHOLARSHIPS

Tuition Scholarship & Travel Award, Summer Institute in Statistical Genetics (SISG)   *7/2023*

Travel Award, Society for the Study of Evolution (SSE) at Evolution Meeting   *7/2023*

Summer Research Fund, Tulane University Mathematics Department   *6/2021, 6/2022, 7/2023*

Outstanding Female Graduating Senior of the Class of 2020, McMurry University   *8/2020*

Martin Trust Honors #1 and Trustees Honors Scholarship, McMurry University   *2018-2020*

Clyde A. and Mary Long Memorial Scholarship, McMurry University   *2019-2020*

Jennie Tate Memorial Scholarship, McMurry University   *2019-2020*

Dean's List, McMurry University   *2016-2020*

PROFESSIONAL DEVELOPMENT

SERVICE AND OUTREACH
Statistics and Probability Research Seminar Co-organizer, Tulane University   *2023-2024*
Association for Women in Mathematics (AWM) Tulane Chapter Secretary   *2022-2023*
American Mathematical Society (AMS) Tulane Chapter Secretary   *2020-2021*
Math Club President, McMurry University   *2018-2019, 2019-2020*

VOLUNTEER
Tulane GiST and BATS Mathematics workshop volunteer   *9/16/2023*
Louisiana FIRST LEGO League State Championship Judge   *1/22/2023*
Math for All Grad School Q&A Panelist   *4/6/2022*
Member of Alpha Phi Omega (APO) Omicron Delta Chapter   *Since 2017*