Ziheng Zhang

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EDUCATION

The University of Texas at Austin **Austin, TX**
Ph.D. in Computational Science, Engineering, Mathematics Aug 2022 –
Advisors: Omar Ghattas, Umberto Villa
Research Interests: uncertainty quantification, optimization, inverse problem, and operator learning

University of Wisconsin-Madison **Madison, WI**
B.S. in Applied Mathematics Aug 2018 – Dec 2021
Certificate in Physics and Computer Science

SKILLS

Course Summary: Algorithms, Optimization, Fluid Dynamics, Mathematical Modeling, PDEs, ODEs, Perturbation Theory, Machine Learning, Stochastic Processes, Numerical Linear Algebra, Numerical Differential Equations
Computer Skills: Python, MATLAB, Java, Mathematica, Julia, Tensorflow, Git, MS Office, Linux, LaTeX

EXPERIENCE

Oden Institute for Computational Engineering and Sciences **Austin, TX**
Graduate Research Assistant – (Optimization, Inversion, ML, and Uncertainty for Complex Systems) Group Oct 2022 –

- Developed a novel computational framework for learning spatially-varying s.p.d operator of generalized Mátern-like models.
- Applied our method on covariance estimation of a Gaussian random field and learning the Hessian operator of inverse problems.

rct AI **Beijing, China**
Reinforcement Learning Algorithm Internship May 2022 – Aug 2022

- Designed reinforcement learning algorithms and applied them in a strategy card game (Python)
- Implemented traditional expert-based scoring tree-search algorithm, which achieved a win rate of 90% against our RL algorithms.

UW Madison, Math Department **Madison, WI**
Undergraduate Research Assistant under Prof. Jean-Luc Thiffeault May 2021 – Dec 2021

- Researched homogenization for a Brownian rod in a lattice of obstacles.
- Derived the effective diffusivity tensor in terms of the smallness and orientation of the rod via matched asymptotic expansions.

Undergraduate Research Assistant under Prof. Nan Chen May 2020 – Apr 2021

- Studied parameter estimation of partially observed systems using conditional Gaussian path-wise sampler
- Conducted numerical tests on different models, including SPEKF, Lagrange data assimilation, Noisy Lorenze-63, & Stochastic FHN

PUBLICATIONS

1. Ziheng Zhang, and Nan Chen. Parameter Estimation of Partially Observed Turbulent Systems Using Conditional Gaussian Path-Wise Sampler. Computation 9.8 2021. https://www.mdpi.com/2079-3197/9/8/91/htm
2. Ziheng Zhang, Umberto Villa, and Omar Ghattas. Covariance Operator Estimation via Generalized Matérn-like model. Manuscript in Preparation.
3. Ziheng Zhang, Umberto Villa, and Omar Ghattas. Approximation of Hessian of Inverse problems via Fractional Reaction-Diffusion Operators. Manuscript in Preparation.
4. Ziheng Zhang, Hongfei Chen, and Jean-Luc Thiffeault. Brownian Rod in a Lattice of Obstacles. Manuscript in Preparation.

INVITED TALKS

1. Aachen Institute for Advanced Study in Computational Engineering Sciences, RWTH Aachen University (upcoming in Dec 2023)