

# Xinran Zhu

## Curriculum vitae

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### EDUCATION

- 2018 – PRESENT **Cornell University**  
Ph.D. student in Applied Mathematics  
Advisor: Prof. David Bindel
- 2014 – 2018 **Shanghai Jiao Tong University**  
B.S. in Mathematics  
(Zhiyuan Honors Degree)

### OTHER EXPERIENCE

- MAY – AUG 2020 **Lawrence Berkeley National Laboratory**  
Research Intern  
Supervisor: Xiaoye Sherry Li
- AUG – DEC 2017 **Center for Applied Mathematics (CAM) at Cornell University**  
Research Intern  
Supervisor: David Bindel
- AUG – DEC 2016 **Massachusetts Institute of Technology**  
Fall Exchange, Special Student Program  
GPA: 5.0/5.0

### RESEARCH INTERESTS

Numerical Optimization, Gaussian Processes, Kernel Methods, Bayesian Optimization, Numerical Linear Algebra.

### PUBLICATION

- Scalable Algorithms for Bayesian Transformed Gaussian Processes**  
Leo Huang\*, **Xinran Zhu\***, Cameron Ibrahim, Eric Hans Lee, David Bindel  
Submitted to *the 24th International Conference on Artificial Intelligence and Statistics (AISTATS 2021)*
- GPtune: Multitask Learning for Autotuning Exascale Applications**  
Yang Liu, Wissam M. Sid-Lakhdar, Osni Marques, **Xinran Zhu**, James W. Demmel, Xiaoye S. Li  
Submitted to *Principles and Practice of Parallel Programming (PPoPP 2021)*

### RESEARCH PROJECTS

- GPtuneBand: Multi-Armed-Bandit-Based Multitask Autotuning**  
AUG 2020 – PRESENT CAM, Cornell University
- Develop a novel multitask autotuning algorithm based on multi-armed bandit strategy
  - Implement in existing GPtune framework, parallelized on distributed-memory machines
  - Show competitive results on real application autotuning
- GPtune: Multitask Learning for Autotuning Exascale Applications**  
MAY 2020 – AUG 2020 Lawrence Berkeley National Laboratory
- Multitask learning experiments on hypre, an algebraic multi-grid numerical PDE solver
  - Showed comparative results on hypre compared with two state-of-the-art autotuners, OpenTuner and HpBandSter

### Scalable Algorithms for Bayesian Transformed Gaussian Processes

- OCT 2019 – OCT 2020 CAM, Cornell University
- Proposed efficient and scalable methods for the BTG model and augmented it with a flexible class of transformations
  - Showed empirically advantages of BTG in data-sparse regimes
  - Developed a Julia-based framework for GP variants (including BTG, WGP, and CWGP) supporting various hyperparameter treatments

### Function Approximation with Bounded Native Space Norm

- FEB 2019 – PRESENT CAM, Cornell University
- Construct an explicit approximation of continuous functions by convolving with an approximated delta function in the native space of an universal kernel
  - Use the variational characterization of kernel interpolation to find the best approximation in the native space

### Dynamics and Equilibrium for Iterated Prisoner's Dilemma

- AUG – DEC 2017 CAM, Cornell University
- Characterized a general pattern of replicator dynamics and the evolution of cooperation for iterated prisoner's dilemma
  - Characterized several initial strategy distributions for certain dynamic patterns

### PROGRAMMING PROFICIENCIES

Julia, Python, MATLAB, R, L<sup>A</sup>T<sub>E</sub>X,

### SELECTED HONORS AND AWARDS

- 2018 Cornell Graduate School Fellowship
- 2018 Zhiyuan Outstanding Graduation Scholarship (**top 2%**)
- 2016, 2015 Zhiyuan Honorary Scholarship
- 2015 Leo KoGuan Scholarship of SJTU (**top 3%**)
- 2015 Academic Excellence Scholarship of SJTU (**top 4%**)
- 2013 First Prize at the Provincial Level of China Mathematics Olympiads (Jiangsu)

### TEACHING EXPERIENCE

- SEP - DEC 2020 **CS 1112: Introduction to Computing Using MATLAB**  
Teaching Assistant, Cornell University
- JAN - MAY 2020 **CS 4220: Numerical Analysis: Linear and Nonlinear Problems**  
Teaching Assistant, Cornell University
- AUG - DEC 2019 **MATH 2940: Linear Algebra for Engineers**  
Teaching Assistant, Cornell University
- MAY - JUNE 2018 **CS 259: Numerical Methods for Data Science**  
Teaching Assistant, Shanghai Jiao Tong University