

# MINGZE WANG

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## SHORT BIO

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I am a second-year Ph.D student in Computational Mathematics, Peking University. I am very fortunate to be advised by **Prof. Weinan E**. Prior to that, I received my B.S. degree in Pure and Applied Mathematics from Zhejiang University in 2021.

## EDUCATION

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### **Peking University**

Ph.D student, *Computational Mathematics*

School of Mathematical Sciences

Advisor: Prof. Weinan E.

Beijing, China

2021.09 - Present

### **Zhejiang University**

Bachelor of Science, *Pure and Applied Mathematics*

School of Mathematical Sciences

Academic ranking: 1/111, Comprehensive ranking: 1/111, Major GPA: 4.84/5 (95.5/100).

Hangzhou, China

2017.09 - 2021.06

## EXPERIENCE

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### **Moqi Technology**

Algorithm Intern

Work on image processing and privacy protection for biometric technology.

Beijing, China

2021.09 - 2022.06

### **Peking University**

Teaching assistant: Calculus (A)

Teaching assistant: Calculus (B)

Beijing, China

Fall 2021

Fall 2022; Spring 2022, 2023

## RESEARCH INTERESTS

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I am broadly interested in theory, algorithm and application of machine learning. I am also interested in non-convex optimization and image processing. Specifically, my recent research topics are

- **Deep learning theory:** optimization, generalization, implicit bias and approximation.
- **Foundation Models:** theory and algorithm.
- **Non-convex Optimization:** theory and algorithm.

## PUBLICATIONS & PREPRINTS

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- [1] **Mingze Wang**, Chao Ma. Understanding Multi-phase Optimization Dynamics and Rich Nonlinear Behaviors of ReLU Networks. *arXiv preprint arXiv:2305.12467*, 2023.
- [2] **Mingze Wang**, Lei Wu. The Noise Geometry of Stochastic Gradient Descent: A Quantitative and Analytical Characterization. *Under review*, 2023.
- [3] **Mingze Wang**, Chao Ma. Early Stage Convergence and Global Convergence of Training Mildly Parameterized Neural Networks. *Thirty-sixth Conference on Neural Information Processing Systems (NeurIPS 2022)*.
- [4] Lei Wu, **Mingze Wang**, Weijie J. Su. When does SGD favor flat minima? A quantitative characterization via linear stability. *Thirty-sixth Conference on Neural Information Processing Systems (NeurIPS 2022)*.
- [5] **Mingze Wang**, Chao Ma. Generalization Error Bounds for Deep Neural Networks Trained by SGD. *arXiv preprint arXiv:2206.03299*, 2022.

**SELECTED TALKS & PRESENTATIONS**

Some mathematical modeling problems and machine learning theory, *Schlumberger (Beijing)*.

2023.07

**SELECTED AWARDS & HONOURS**

PKU Academic Innovation Award (top 1%)

2022.10

Outstanding Graduate of Zhejiang Province (top 5%)

2021.05

Outstanding Graduate of ZJU

2021.05

Chinese National Scholarship (top 1%)

2019.10

First Class Scholarship of ZJU (top 3%)

2019, 2020.10

Zhejiang Provincial Government Scholarship

2018.10

First Prize of Mathematical Contest in Modeling of ZJU (top 1%)

2020.06

Meritourious Award in The Mathematical Contest in Modeling

2020.02

National Second Prize of Chinese Undergraduate Mathematical Contest in Modeling (top 2.5%)

2019.10

**SELECTED UNDERGRADUATE TRANSCRIPT**

Real Analysis	100	Functional Analysis	100	Partial Differential Equation	100
Scientific Computing	100	Mathematical Analysis (II)	99	Differential Geometry	99
Point Topology	99	Mathematical Physics	97	Complex Analysis	97
Calculus (I)	97	Stochastic Process	96	Foundation of Analysis	96