

TANSHENG ZHU

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EDUCATION

Shanghai Jiao Tong University <i>B.S. in Mathematics and Applied Mathematics (Hons), Zhiyuan College</i>	Aug. 2021 – June 2025 (Expected) Shanghai, China
The Chinese University of Hong Kong <i>Exchange Student, Department of Mathematics</i>	Jan. 2024 – May 2024 Hong Kong, China
Summer School on Mathematical Methods in Science and Engineering <i>School of Mathematical Sciences, East China Normal University</i>	Aug. 2023 Shanghai, China

COURSEWORK

Overall Average Grade: 90.42/100, **GPA:** 3.93/4.3, **Ranking:** 5/21.

Courses: Optimization Methods, Mathematical Programming, Foundations of Data Science, Numerical Analysis and Scientific Computing, Numerical Methods for ODE & PDEs, Probability, Stochastic Process, Calculus on Manifolds, Differential Geometry.

Awards: The Winning Prize of 2024 S.-T. Yau College Student Mathematics Contest (Appl. & Comp. Math.), The Finalist Winner of 2024 Mathematical Contest in Modeling (Top 3%), The First Prize of 2023 Chinese Mathematics Competitions (Shanghai Division), The Second Prize of 2023 Asia and Pacific Mathematical Contest in Modeling.

RESEARCH EXPERIENCE

Laboratory on Fast Algorithms and High-Performance Computing <i>Bayesian Optimization Research Intern, advised by Prof. Zhenli Xu.</i>	Nov. 2022 – Present
<ul style="list-style-type: none"> Proposed the improved kernel regression upper confidence bound (IKR-UCB) algorithm under the Bayesian optimization framework, which is derived from the error bounds of Nadaraya-Watson kernel regression with dependent observations and more efficient than existing methods. Studied on the generalization of Monte Carlo tree search in continuous action space. Proposed the IKR-UCT algorithm to enhance efficiency and reduce computation costs in online planning tasks. 	
Prof. Fenglei Fan's Lab at The Chinese University of Hong Kong <i>Deep Learning Theory Research Intern</i>	Jan. 2024 – Present
<ul style="list-style-type: none"> Studied the properties of neural networks with infinite depth and finite width. Generalized the neural tangent kernel (NTK) theories from infinitely-wide networks to infinitely-deep networks with skip connections using weakly dependence theory. 	

COURSE PROJECTS

Dendritic Computing with Bilinear Rules and Artificial Neural Networks Team leader of the group project, advised by Prof. Douglas Zhou.	Fall 2023
<ul style="list-style-type: none"> Constructed bilinear rules of dendrite integration from theory to practice. Implemented artificial neural network models hLN and DBNN to fit real neuron data, and the limitation of ANN's parametric space is discussed. 	
Solving Differential Equations with Deep Learning Individual project, advised by Prof. Xiaoqun Zhang and Prof. Zhi-Qin John Xu.	Fall 2023
<ul style="list-style-type: none"> Constructed the framework of physics-informed neural network (PINN) for both forward and inverse problems. Analysed the error components and improve them by incorporating more physics information. 	
Modeling and Optimization of Biological Transport Networks Team leader of the group project, earned the highest score, advised by Prof. Dan Hu.	Spring 2023
<ul style="list-style-type: none"> Built the dynamics of the biological transport network. Implemented different optimization algorithms, and explained the entangled-network phenomenon of results based on spectrum of the graph Laplacian matrix. 	
Computational Mean-field Optimal Control Individual project, advised by Prof. Lei Li.	Spring 2023
<ul style="list-style-type: none"> Studied a class of reaction-diffusion equation mean-field information dynamics, designed the corresponding primal-dual hybrid gradient (PDHG) algorithm to solve the saddle point problem. 	

HONORS AND AWARDS

Huawei Scholarship: Awarded to Top 5% students in the major.	2023
Zhiyuan Outstanding Leader Scholarship: Awarded for outstanding leadership.	2022
The First Prize Scholarship for Excellent Student: Awarded to Top 1% students in the grade.	2022
Merit Student: Awarded to Top 1% students in the class.	2022
Zhiyuan Honors Scholarship (3x): Awarded for academic excellence.	2021 – 2023

SKILLS

Programming Languages: Python, Matlab, R, C/C++, L^AT_EX, Markdown, CSS, HTML.
Toolkits: NumPy, SciPy, Sklearn, Pandas, Statsmodels, Matplotlib, PyTorch, Cython, Numba, Gurobi.
Language Proficiency: Mandarin (native), English (fluent, CET-6: 560)

REFERENCES

Zhenli Xu, xuzl@sjtu.edu.cn,
Professor of Shanghai Jiao Tong University, Shanghai, China.
Fenglei Fan, flfan@math.cuhk.edu.hk,
Research Assistant Professor of The Chinese University of Hong Kong, Hong Kong, China.