

Zhen Zhang

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Education

Brown University

Ph.D. Student, Applied Mathematics, 4.0/4.0

Relevant coursework: Deep Learning, Real/Functional Analysis, Probability Theory, Partial Differential Equations, Discontinuous Galerkin Methods, Stochastic Control, Dynamical Systems

Providence, RI

2018-Present

Brown University

Sc.M., Applied Mathematics

Providence, RI

2018-2019

City University of Hong Kong

B.Sc., Computing Mathematics, Minor in Computing, 4.11/4.3

Dean's List every semester

Hong Kong

2014-2018

University of Toronto

Exchange, Mathematics, 4.0/4.0

Toronto, Canada

2017-2017

Research Interests

- Physics priors in neural networks
- Dynamical system view of deep learning
- Computational fluid dynamics

Honors & Awards

HKSAR Government Scholarship

Joseph Lau Student Exchange Awards

HKSAR Government Scholarship Fund - Reaching Out Award

Publications

P. Jin, **Z. Zhang** (Co-first Author), A. Zhu, G. Karniadakis, Y. Tang. *SympNets: Intrinsic structure-preserving symplectic networks for identifying Hamiltonian systems.* (Under review)

Research Experience

Brown University

Graduate Student Researcher

Currently I am working on inferring the dynamics of the Hamiltonian Equations by placing physics priors on standard neural networks.

2019-Present

City University of Hong Kong

Final Year Project

Study theoretical aspect of Deep Neural Network. Run numerical simulations on image classification problems to verify the approximation properties of Convolutional Neural Networks.

2017-2018

Liu Bie Ju Center for Mathematical Sciences**2017-2017***Summer Research Opportunity*

Systematically studied asymptotic analysis and Painleve Equations under Dr. Wang's guidance. Gave series solution to a group of ODEs, and tried to give a closed form solution based on well-known special functions. Reviewed Prof. Wong's work on second order linear difference equations.

University of Tennessee & Oak Ridge National Laboratory**2016-2016***Research for Undergraduates (REU)*

Received training on high performance computing in Oak Ridge National Laboratory. Implemented dasymetric mapping algorithm in GIS and proposed a parallel version of the algorithm. The new method effectively improved running efficiency.

Teaching Experience

- **APMA 1170:** Introduction to Computational Linear Algebra, head teaching assistant (Fall 2019)
- **APMA 1660:** Statistical Inference II, head teaching assistant (Spring 2020)

Mentoring Experience

Peer-Assisted Learning Scheme using Supplemental Instruction**2016-2017***Student Mentor*

Gave freshmen tutorials on Calculus and organized discussion groups.

CityU Student Mentoring Program**2017-2018***PALSI leader*

Organized orientation and give new students help in academics.

Math Help Center**2017-2018***Discussion Leader*

Organized discussions and answered questions related to engineering mathematics.

Presentations

Crunch Seminar**Apr, 2020**

Symplectic networks: Intrinsic structure-preserving networks for identifying Hamiltonian systems

Programming Skills

Languages: Java, C/C++, SQL, MATLAB, Python, SAS, Linux Command, LaTeX.

Packages: TensorFlow, PyTorch.

Outreach & Services

CityU Choir Committee**2015-2016***Membership Secretary of Bass*

Organized annual performance and conducted regular training of bass section.

Cornwall School**2015-2016***Volunteer*

Teach and help mentally disabled students with daily lives.