

Zheng Ma

GOLOMB VISITING ASSISTANT PROFESSOR OF MATHEMATICS

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Positions

Purdue University

GOLOMB VISITING ASSISTANT PROFESSOR OF MATHEMATICS

- Mentor: Jingwei Hu

West Lafayette, USA

Aug. 2017 – Present

University of Wisconsin Madison

VISITING SCHOLAR OF MATHEMATICS DEPARTMENT

- Collaborator: Shi Jin

Madison, USA

Feb. 2015 – Dec. 2015

Education

Shanghai Jiao Tong Univeristy

PH.D. IN COMPUTATIONAL MATHEMATICS

- Dissertation: Numerical Methods for Transport Equations and Wave Propagations with Multiple Scales and Uncertainty
- Advisor: Prof. Shi Jin

Shanghai, China

Sep. 2012 – July. 2017

Zhiyuan College, Shanghai Jiao Tong Univeristy

B.S. IN MATHEMATICS AND APPLIED MATHEMATICS

- Minor: Applied Physics
- Thesis: The WENO Scheme for Liouville Equation of Geometrical Optics with Discontinuous Local Wave Speeds
- Advisor: Prof. Shi Jin

Shanghai, China

Sep. 2008 – July. 2012

Awards

ACADEMIC RELATED

- 2019 **Best Article Awards**, Celebrating the 5th anniversary of Research in the Mathematical Sciences

OTHERS

- 2017 **Outstanding Ph.D. Graduates Awards**, Shanghai Jiao Tong University

Publications

JOURNAL ARTICLES

- [1] **Uniformly accurate machine learning-based hydrodynamic models for kinetic equations**
J. HAN, C. MA, Z. MA, W. E
Proceedings of the National Academy of Sciences (PNAS) 116.44 (2019) pp. 21983–21991. 2019.
- [2] **A Fast Spectral Method for the Inelastic Boltzmann Collision Operator and Application to Heated Granular Gases**
J. HU, Z. MA
Journal of Computational Physics 385 (2019) pp. 119–134. 2019.
- [3] **Theory of the Frequency Principle for General Deep Neural Networks**
T. LUO, Z. MA, Z.-Q. J. XU, Y. ZHANG
Preprint, 2019.
- [4] **The Discrete Stochastic Galerkin Method for Hyperbolic Equations with Non-smooth and Random Coefficients**
S. JIN, Z. MA
Journal of Scientific Computing 74.1 (Jan. 2018) pp. 97–121. 2018.
- [5] **Uniform Spectral Convergence of the Stochastic Galerkin Method for the Linear Transport Equations with Random Inputs in Diffusive Regime and a Micro-Macro Decomposition-Based Asymptotic-Preserving Method**
S. JIN, J.-G. LIU, Z. MA
Research in the Mathematical Sciences 4.1 (Aug. 2017) p. 15. 2017.
- [6] **Explicit and Implicit TVD Schemes for Conservation Laws with Caputo Derivatives**
J.-G. LIU, Z. MA, Z. ZHOU

[7] **An Improved Semi-Lagrangian Time Splitting Spectral Method for the Semi-classical Schrödinger Equation with Vector Potentials Using NUFFT**

Z. MA, Y. ZHANG, Z. ZHOU

Applied Numerical Mathematics 111 (2017) pp. 144–159. 2017.

CONFERENCE PROCEEDINGS

[1] **A type of generalization error induced by initialization in deep neural networks**

Z.-Q. J. XU, Y. ZHANG, T. LUO, Z. MA

Preprint, 2019.

[2] **Explicitizing an Implicit Bias of the Frequency Principle in Two-layer Neural Networks**

Z.-Q. J. XU, Y. ZHANG, T. LUO, Z. MA

Preprint, 2019.

[3] **Frequency Principle: Fourier Analysis Sheds Light on Deep Neural Networks**

Z.-Q. J. XU, Y. ZHANG, T. LUO, Y. XIAO, Z. MA

Preprint, 2019.

Talks

Innovative Trends in the Numerical Analysis & Simulation of Kinetic Equations

Oberwolfach, Germany

OBERWOLFACH MINI-WORKSHOP

Dec. 2018

- Title: A Fast Spectral Method for the Inelastic Boltzmann Collision Operator

The 10th International Conference on Computational Physics

Macao, China

MINI-SYMPOSIUM ON NUMERICAL SIMULATION AND MATHEMATICAL MODELING OF KINETIC EQUATIONS

Jan. 2017

- Title: Uncertainty Quantification for Linear Transport Equation with Random Inputs: Analysis and Numerics

XVI International Conference on Hyperbolic Problems: Theory Numerics, Applications

Aachen, Germany

SESSION ON UQ/STOCHASTIC

Aug. 2016

- Title: Uncertainty Quantification for Conservation Laws: A Discrete Stochastic Galerkin Approach

Teaching

MA303 (Differential Equations and Partial Differential Equations for Engineering and the Sciences)

Purdue University

INSTRUCTOR

Fall 2019

- Textbook: Differential Equations and Boundary Value Problems C & M

MA266 (Ordinary Differential Equations)

Purdue University

INSTRUCTOR

Fall 2017 – Spring 2019

- Textbook: Differential Equations and Boundary Value Problems