

Senwei Liang

Mathematics PhD Candidate

[Semantic scholar](#), [Google scholar](#), [Github](#)

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[Personal Page](#)

RESEARCH DIRECTION

My interest is mathematics of machine learning with applications in solving differential equations.

EDUCATION

- **Purdue University** West Lafayette, USA
PhD Candidate. Advisor: Prof. Haizhao Yang Dec. 2019 – onwards
- **National University of Singapore** Singapore, Singapore
Master of Science. Advisor: Prof. Haizhao Yang Aug. 2017 – Dec. 2019
 - **GPA:** 4.86/5.0;
 - **Core Curriculum:** Graduate Analysis (A+), Optimization (A+), Computational Mathematics (A+).
- **Sun Yat-Sen University** Guangzhou, China
Mathematics and Applied Mathematics, Bachelor of Science. Advisor: Prof. Lihua Yang Aug. 2013 – Jun. 2017
 - **GPA:** 4.40/5.0; **Synthesizing grade ranking:** 1/102;
 - **Core Curriculum:** Analysis (98/100), Algebra (97/100), Geometry (99/100), Ordinary Differential Equation (98/100), Probability Theory (98/100), Real Analysis (97/100), Complex Analysis (100/100).

INTERNSHIP

- **Argonne National Laboratory** Lemont, USA
Wallace Givens Associate. Advisor: Prof. Hong Zhang May 2021 – July 2021
- **Computational Medical Imaging Laboratory** Guangzhou, China
Research Assistant. Advisor: Prof. Yao Lu June 2016 – January 2017

PUBLICATIONS AND MANUSCRIPTS

1. Y. Gu, J. Harlim, **S. Liang**, H. Yang, Stationary Density Estimation of Itô Diffusions Using Deep Learning. Submitted. [\[PDF\]](#) (alphabetical order)
2. **S. Liang**, S. W. Jiang, J. Harlim, H. Yang, Solving PDEs on Unknown Manifolds with Machine Learning. Submitted. [\[PDF\]](#)
3. **S. Liang***, L. Lyu*, C. Wang, H. Yang, Reproducing Activation Function for Deep Learning. Submitted. [\[PDF\]](#)
4. Z. Huang*, **S. Liang*** (joint first author), M. Liang, W. He, H. Yang, Efficient Attention Network: Accelerate Attention by Searching Where to Plug. Submitted. [\[PDF\]](#) [\[Code\]](#)
5. J. Xue, N. Jiang, **S. Liang**, Q. Pang, T. Yabe, S.V. Ukkusuri, J. Ma, Urban road network homogeneity reveals maturity and inheritance of cities. Submitted. [\[PDF\]](#) [\[Code\]](#)
6. J. Harlim, S. W. Jiang, **S. Liang**, H. Yang, Machine Learning for Prediction with Missing Dynamics. Journal of Computational Physics 428, 109922. [\[PDF\]](#) (alphabetical order)
7. W. He, Z. Huang, M. Liang, **S. Liang**, H. Yang, Blending Pruning Criteria for Convolutional Neural Networks. International Conference on Artificial Neural Networks, 3-15. [\[PDF\]](#)
8. Z. Huang*, **S. Liang*** (joint first author), M. Liang and H. Yang, DIANet: Dense-and-Implicit Attention Network. Proceedings of the AAAI Conference on Artificial Intelligence 2020. [\[PDF\]](#) [\[Code\]](#)
9. **S. Liang***, Z. Huang*, M. Liang and H. Yang, Instance Enhancement Batch Normalization: An Adaptive Regulator for Batch Noise. Proceedings of AAAI Conference on Artificial Intelligence 2020. [\[PDF\]](#) [\[Code\]](#)
10. **S. Liang**, Y. Khoo, H. Yang, Drop-Activation: Implicit Parameter Reduction and Harmonic Regularization. Communications on Applied Mathematics and Computation, 1-19. [\[PDF\]](#) [\[Code\]](#)

AWARDS

- Ross-Lynn fellowship, Purdue University, 2021-2022.
- Top Graduate Tutors for AY2019/20 (SGD 100), Department of Mathematics, NUS.
- 2020 Thirty-fourth AAAI Conference Scholarship (USD 100).
- 2015-2016 Samsung Scholarship (CNY 5000), awarded by Samsung.
- 2013-2014 National Scholarship (CNY 8000), awarded by Ministry of Education of China.
- 2013-2014, 2014-2015, 2015-2016 Outstanding Student Scholarship (CNY 2000), awarded by SYSU.

INVITED PRESENTATION IN CONFERENCE AND WORKSHOPS

- Solving PDEs on Unknown Manifolds with Machine Learning, AMS Sectional meeting, Purdue University, March 2022
- Solving PDEs on Unknown Manifolds with Machine Learning, Joint Mathematics Meetings, Seattle WA, Jan 2022
- Solving PDEs on Unknown Manifolds with Machine Learning, 4th Annual Meeting of the SIAM Texas-Louisiana Section, UTRGV, South Padre Island, Texas, Nov 2021,
- Solving PDEs on Unknown Manifolds with Machine Learning, SIAM Southeastern Atlantic Section Conference, Auburn University, Sep 2021
- Solving PDEs on Unknown Manifolds with Machine Learning, IMA Workshop on the Mathematical Foundation and Applications of Deep Learning, Purdue University, Aug 2021
- DIANet: Dense-and-Implicit Attention Network, Conference on “Thirty-Forth AAAI Conference on Artificial Intelligence”, New York USA, February, 2020.
- Instance Enhancement Batch Normalization: An Adaptive Regulator for Batch Noise, Conference on “Thirty-Forth AAAI Conference on Artificial Intelligence”, New York USA, February, 2020.
- Regularization Methods of Deep Learning for Image Classification, Workshop on “High-Dimensional Learning and Computation in Physics”, National University of Singapore, Singapore, June, 2019.

PROGRAMMING SKILLS

- **Languages:** Python (PyTorch, TensorFlow), MATLAB, L^AT_EX

CONTRIBUTED PACKAGES

- **Self-attention Network for Image Classification** [[Repository](#)]
 - **Description:** in this repository, we collect some popular and effective attention models used to boost the performance of neural networks on image classification. For example, DIANet, IEBN, EAN.

ACADEMIC SERVICE

- **Service**
 - **Conference Reviewer:**
2022, 2021 Conference on Computer Vision and Pattern Recognition;
2021 AAAI Conference on Artificial Intelligence;
2021 International Conference on Artificial Neural Networks;
2020 Conference on Mathematical and Scientific Machine Learning.
 - **Journal Reviewer:**
Journal of Scientific Computing (JOMP).
 - **Organizer:**
AMS Sectional meeting, Purdue University, March 2022;
4th Annual Meeting of the SIAM Texas-Louisiana Section, Nov 2021.
 - **Assistant:**
IMA Workshop on the Mathematical Foundation and Applications of Deep Learning, Purdue University, Aug 2021.