MINGLANG YIN

Center for Biomedical Engineering, Brown University, Providence, RI, 02912

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EDUCATION

Doctor of Philosophy in Biomedical Engineering   2018 - Present
Brown University   Providence, RI
Advisor: George Em Karniadakis

Master of Science in Fluids and Thermal Sciences   2016 - 2018
Brown University   Providence, RI
Advisor: George Em Karniadakis
Thesis: 3D/1D computed fractional flow reserve comparison in coronary artery disease

Bachelor of Science in Aeronautical Engineering   2012 - 2016
Northwestern Polytechnical University   Xi'an, Shaanxi, China
Advisor: Weiwei Zhang
Thesis: Reduced-order aerodynamic modeling and study on generalization capability

RESERCH INTERESTS

Biomechanics, Scientific Machine Learning, Computational Fluid Dynamics, Uncertainty Quantification

EXPERIENCE

Research Assistance

· Division of Applied Mathematics, Brown University   Jan. 2018 - Present
· School of Aeronautics, Northwestern Polytechnical University(advisor: Weiwei Zhang)   Jan. 2016- Jul. 2016

Lecturer

· Brown University(Pre-college program: introduction to mechanical engineering)   Aug. 2017
· School of Engineering, Brown University

Referee

· Journal of Computational Physics, Journal of Royal Society Interface, Soft Matter, Computers and Structures, Computer Methods in Applied Mechanics and Engineering, Engineering with Computers

PUBLICATIONS

M. Yin, E. Ban, E. Zhang, B. Rego, C. Cavinato, J.D. Humphrey, G.E. Karniadakis, "Simulating progressive intramural damage leading to aortic dissection using an operator-regression neural network", arXiv:2108.11985 (2021).

S. Goswami, **M. Yin**, Y. Yu, G.E. Karniadakis, "A physics-informed variational DeepONet for predicting the crack path in brittle materials", arXiv:2108.06905 (2021).

S. Cai, Z. Mao, Z. Wang, **M. Yin**, G.E. Karniadakis, "Physics-informed neural networks in fluid mechanics: A review", Acta Mechanica Sinica (2021).

A. Blumers*, **M. Yin***, Y. Hasegawa, Z. Li, and G.E. Karniadakis. "Supervised parallel-in-time algorithm for long-time Lagrangian simulations of stochastic dynamics: Application to blood flow in zebrafish", Computational Mechanics (2021).

M. Yin, X. Zheng, J.D. Humphrey, G.E. Karniadakis, "Non-invasive inference of thrombus material properties with physics-informed neural networks." Computer Methods in Applied Mechanics and Engineering 375 (2021): 113603.

E. Zhang, **M. Yin** G.E. Karniadakis, "Physics-Informed Neural Networks for Nonhomogeneous Material Identification in Elasticity Imaging", AAAI Conference (2020).

M. Yin, A. Yazdani, and G.E. Karniadakis. "One-dimensional modeling of fractional flow reserve in coronary artery disease: Uncertainty quantification and Bayesian optimization." Computer Methods in Applied Mechanics and Engineering, 353 (2019): 66-85.

D. Hopper, D. Jaganathan, J. Orr, J. Shi, F. Simeski, **M. Yin**, J.T.C. Liu, "Heat Transfer in Nanofluid Boundary Layer Near Adiabatic Wall." Journal of Nanofluids 7.6 (2018): 1297-1302.

M. Yin, J. Kou, W. Zhang, "A reduced-order aerodynamic model with high generalization capability based on neural network", Acta Aerodynamica Sinica 35.02 (2017): 205-213.

J. Kou, W. Zhang, and **M. Yin**, "Novel Wiener models with a time-delayed nonlinear block and their identification." Nonlinear Dynamics 85.4 (2016): 2389-2404.

CONFERENCES AND TALKS

Presentations/Posters
- **2021 IMECE (Online)** Predicting Injection-caused Delamination in Aortic Walls using DeepONet
- **2021 USNCCM16 (Online)**, Data-Driven Modeling of Injection-Caused Delamination on Aortic Walls Using DeepONet
- **2020 APS DFD (Online)**, Non-invasive Inference of Thrombus Material Properties with Physics-Informed Neural Networks
- **2020 Mach Conference (Accepted)** Physics-informed neural networks for solving forward and inverse problem with phase field models
- **2019 APS DFD (Seattle, WA)** Comparison of Multi-scale Models for Blood Flow in Zebrafish Brain, APS Division of Fluid Dynamics
- **2019 BMES Annual Meeting (Philadelphia, PA)** (Poster) Numerical Study on Hemodynamics of Brain Vasculature in Early Zebrafish Life
- **2019 SIAM CSE, (Spokane, WA)** Parameter Inference and Uncertainty Quantification in Simulating Blood Flow in Coronary Arteries

Invited Talks
- **Northwestern Polytechnical University (Online), Aug. 2021:** Physics-Informed Machine Learning and its Application in Multiscale Modeling
- **Parallel-in-Time (PinT) Workshop (Online), Aug. 2021**, Time parallel in PDEs using machine learning tools
- **NVIDIA GTC (Online), Apr. 2021**, Non-invasive Inference of Thrombus Material Properties with Physics-Informed Neural Networks

Training
- San Diego Supercomputing Center summer institute on High Performance Computing and Data Science, San Diego, CA, 2019
- Integrating Machine Learning with Multiscale Modeling for Biomedical, Biological, and Behavioral Systems, Bethesda, MD, 2019

HONORS AND AWARDS

Sigma Xi honor society member, 2021

Conference award, 16th U.S. National Congress on Computational Mechanics, 2021

Travel award, San Diego Supercomputing Center summer institute on High Performance Computing and Data Science, 2019

Undergraduate Scholarship, Northwestern Polytechnical University, 2014

COMPUTATIONAL SKILLS

Programming Language: C/C++, Python, R, Julia, FORTRAN, Scripting language, Matlab, Javascript
Parallel computing: Message Passing Interface(MPI), CUDA, Extensive experience on Titan, SUMMIT, COMIT and Stampede II.
Machine learning library: PyTorch, Tensorflow, Keras
Meshing: Pointwise
Others: Paraview, VMTK, Tecplot 360, MySQL