Jinhong Wu | Curriculum Vitae

github.com/wsnow99 wsnow99.github.io
wujh2019@gmail.com (+86) 13207263612

SUMMARY

Research Interests: My research primarily lies in **deep learning** and **data-driven science and engineering** (e.g., intelligent fluid dynamics), Additionally, I am interested in the **digital twin**, **physics-informed neural network** and **fault diagnosis**. My ultimate objective is to integrate deep learning algorithms with traditional scientific methodologies to create intelligent agents that bridge the virtual and physical world.
Highlight: 5 years of programming experience; 4 years of research experience with solid mathematical and theoretical background; attended the Oriel College Summer School at the University of Oxford (2019).
Relevant Courses: Matrix Theory (96), Mathematical Statistics (93), Introduction to Robotics (93), Linear Algebra (95), System Dynamic & control (99), Calculus (99), Complex function and Integral Transform (93), Dynamics and Bifurcations (99), Engineering Graphics (96), Dynamics (94), Mission Planning for Unmanned Aerial (92), Aerodynamics (98), Computational Fluid Dynamics (98).

EDUCATION

Huazhong University of Science and Technology (HUST) **Wuhan, CHN**
M.E. in Mechanical Engineering *September 2021 - June 2024 (expected)*

- GPA: 3.87/4.0
- Rank: 5/51
- Centesimal grade average: 89.09

Huazhong University of Science and Technology (HUST) **Wuhan, CHN**
B.E. in Aircraft Design and Engineering *September 2017 - June 2021*

- GPA: 3.97/4.0
- Rank: 3/42
- Centesimal grade average: 92.50

AWARDS & HONORS

- **Merit Postgraduate**, Huazhong University of Science and Technology, 2022
- **First-class Scholarship for Postgraduates**, HUST, **2021, 2022**, top 1% students in HUST
- **Third Prize of Zhixing Scholarship**, Huazhong University of Science and Technology, 2022
- **Graduate Freshman Scholarship**, HUST, 2021, top 10% students (Recommended exemption Graduate)
- **Outstanding Graduates**, Huazhong University of Science and Technology, 2021
- **Excellent Graduation Thesis**, HUST, 2021, top 5% students in HUST
- **Outstanding Undergraduate Students**, HUST, 2018, top 1% students in HUST
- **National Encouragement Fellowship**, HUST, **2018, 2019, 2020**, top 5% students in HUST
- **Merit Student**, Huazhong University of Science and Technology, 2019
- **Model Student of Academic Records**, Huazhong University of Science and Technology, 2017

RESEARCH EXPERIENCE

Machine Learning-Based Manipulation Technique for Low-Frequency Acoustic Field *2021 - 2022*

- **Introduction:** Conventional optimization methods for acoustic metasurfaces typically rely on high-performance numerical simulation models, which can lead to significant computational costs and time-consuming simulations.
- Proposed a deep learning-based optimization framework for achieving acoustic uniformity, which consists of three key components: Data Preparation, Multi-Fidelity Neural Network, and Physical Parameters Optimization.

- Multi-Fidelity Neural Network reaches the highest accuracy and the mean absolute error is improved by at least 20% compared to the comparative models. The variance of the obtained scattered acoustic field after optimization is reduced by 3.62%, and the time cost is only 8% of the genetic algotithm.

Physics-informed Physics Field Prediction *2022 – 2023*

- **Introduction:** Data-driven models typically require a large amount of data, which can be difficult to obtain in engineering applications. Moreover, the extrapolation performance of these models is often poor, and the predicted results may not be consistent with physical laws.
- Proposed a physics-informed neural network that incorporates the heat transfer equation and boundary conditions into the loss function to predict the temperature field of a fuel tank.
- Compared to unconstrained models, the MAE of the predicted temperature field was reduced from 1.1 to 0.69.

Fault diagnosis in Edge Computing Scenarios *2022 – 2023*

- **Introduction:** State-of-art fault diagnosis models mainly consider the generality and accuracy and involves little in the memory size and speed, which is a key point once deployed in the edge devices.
- Proposed a model based on the structurally re-parameterized convolution neural network (SrepCNN) to reduce the memory size. Used Mel-Frequency Cepstral Coefficients (MFCC) to extract the important features of input signals.
- The inference speed and hardware overhead can be highly improved through structural re-parameterization.

SKILLS

Programming	Matlab, Python, C++
Frameworks	Linux, PyTorch, Tensorflow, Numpy, JAX, OpenCV, ROS
Languages	English (**IELTS: 6.5**)

PUBLICATIONS

- **A structurally re-parameterized convolution neural network-based method for gearbox fault diagnosis in edge computing scenarios**
  Yanzhi Wang, **Jinhong Wu**, Ziyang Yu, Jiexiang Hu, Qi Zhou*
  Engineering Applications of Artificial Intelligence, 2023. **IF: 7.4, Rank: Q1.** DOI: 10.1016/j.engappai.2023.107091
- **A deep learning-based multi-fidelity optimization method for the design of acoustic metasurface**
  Jinhong Wu, Xingxing Feng, Xuan Cai, Xufeng Huang, Qi Zhou*
  Engineering with Computers, 2022. **IF: 8.083, Rank: Q1.** DOI: 10.1007/s00366-022-01765-9
- **A two-stage adaptive multi-fidelity surrogate model-assisted multi-objective genetic algorithm for computationally expensive problems**
  Qi Zhou (supervisor), **Jinhong Wu**, Tao Xue, Peng Jin*
  Engineering with Computers, 2021. **IF: 8.083, Rank: Q1.** DOI: 10.1007/s00366-019-00844-8
- **Study on productivity and aerosol emissions of magnetic field-assisted EDM process of SiCp/Al composite with high volume fractions**
  Zhen Zhang, Yi Zhang, Liquan Lin, **Jinhong Wu**, Haishen Yu, Xin Pan, Guangliang Li, Jie Wu, Tao Xue*
  Journal of Cleaner Production, 2021. **IF: 11.072, Rank: Q1.** DOI: 10.1016/j.jclepro.2021.126018

COMPETITIONS (selected)

- **The 19th China Postgraduate Mathematical Contest in Modeling (CPMCM) - Huawei Cup**, National Second Prize, 2022
- **Huawei Software Elite Challenge (Wuhan-Changsha Division)**, Second Prize, 2022
- **Mechanical Engineering Innovation and Creativity Competition (Fault diagnosis of motor current signals)**, National Second Prize, 2022
- **Alibaba Cloud Tianchi AAAI 2022 Security AI Challenger Program Phase 8**, Top 1% (30/3169), 2021
- **Jiangsu Big Data Development and Application Competition (Cancer image segmentation)**, Top 2% (13/653), 2020