Haoyang Zheng

PH.D. STUDENT & INTERN APPLICANT

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Education

College of Engineering, Purdue University *IN, USA*

Ph.D. in Mechanical Engineering *Jun. 2021 - Now*

- GPA 3.9/4.0

College of Engineering, Purdue University *IN, USA*

M.S. in Mechanical Engineering *Sep. 2019 - May. 2021*

- GPA 3.8/4.0

School of Computer and Information Science, Southwest University *Chongqing, China*

B.Eng. in Automation *Sep. 2014 - Jun. 2018*

- GPA 88/100, Rank 1/92

Publication

[1] **Haoyang Zheng**, Jeffrey R. Petrella, P. Murali Doraiswamy, Guang Lin*, Wenrui Hao, "Data-driven causal model discovery and personalized prediction in Alzheimer's disease", *NPJ digital medicine* (2022);

[2] **Haoyang Zheng**, Ziyang Huang, Guang Lin*, "A physics-constrained neural network for multiphase flows", *Physics of Fluids* (2022);

[3] **Haoyang Zheng**, Yong Deng*, Yong Hu, "Fuzzy evidential influence diagram and its evaluation algorithm", *Knowledge-Based Systems* (2017);

[4] **Haoyang Zheng**, Yong Deng*, "Evaluation method based on fuzzy relations between Dempster-Shafer belief structure", *International Journal of Intelligent Systems* (2018);

[5] Tian Bian, **Haoyang Zheng**, Yong Deng*, "Failure Mode and Effect Analysis based on D numbers and TOPSIS", *Quality and Reliability Engineering International* (2018);

[6] Likang Yin, **Haoyang Zheng**, Tian Bian, Yong Deng*, "An Evidential Link Prediction Method and Link Predictability Based On Shannon Entropy", *Physica A* (2017).

Research Experience

School of Mechanical Engineering, Purdue University *West Lafayette, IN*

Research Assistant *Jul. 2021 - Now*

- **Key words: Deep learning, Machine learning, Applied mathematics**
- Proposed a data-driven causal model described by ODEs to reveal Alzheimer's disease progression in different stages and provide accurate personalized disease progression predictions for patients.
- Proposed a physics-constrained neural network to predict sequential patterns and motions of multiphase flows with implicit and explicit physical constraints;

Department of Mathematics, Purdue University *West Lafayette, IN*

Visiting Scholar *Jul. 2018 - Apr. 2019*

- **Key words: Uncertainty quantification, Gaussian processes, multi-fidelity modeling, state-space model**
- Proposed a method to propagate uncertainties between aleatory uncertainty and epistemic uncertainty by multi-fidelity Gaussian process and fuzzy set theory;
- Applied Gaussian process, Fourier transform and State-space model to analyze time series with uncertainties;

School of Computer and Information Science, Southwest University *Chongqing, China*

Undergraduate Research Assistant *Oct. 2014 - Jun. 2018*

- **Key words: epistemic uncertainty, Dempster-Shafer evidence theory, fuzzy set theory, risk evaluation, decision making**
- Proposed fuzzy evidential influence diagram to allow multiple experts to evaluate risks among complex systems;
- Proposed a method to estimate the membership degree function and basic probability assignment among top event and basic events;
- Proposed a failure mode and effects analysis model based on fault tree, D numbers and TOPSIS;

Teaching Experience

Purdue University *West Lafayette, IN*

Teaching Assistant *Aug. 2019 - Now*

- **ME 270: Basic Mechanics I** (2022 Fall)
- **ME 375: System Modeling and Analysis** (2021 Spring, 2021 Fall)
- **ME 475: Automatic Control Systems** (2020 Fall, 2020 Spring)
- **ME 352: Machine Design I** (2020 Summer)
- **EAPS 507: Introduction to Analysis and Computing with Geoscience Data** (2019 Fall)

Skills

Programming Python (TensorFlow, PyTorch), MATLAB, R, C, Java

Research skills LaTeX, Origin Lab, EndNote, Visio, Notion

Achievements

Selected Honors

2017 **Finalist (0.5%),** Interdisciplinary Contest in Modeling *COMAP*

2016 **Special prize (2/3568),** International Mathematical Contest in Modeling *GMMCA*

Selected Awards

2018 **Pacemaker to Technological Innovation in Chongqing,** Awarded 10 college students every two years *Chongqing, China*

2018 **Outstanding undergraduates in Chongqing,** Awarded 1% of all college undergraduate students every year *Chongqing, China*

2015 **China National Scholarship,** Awarded 1% of all undergraduates in China *China*