WANG MA

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SUMMARY

Ph.D. student specializing in Uncertainty Quantification and Bayesian Deep Learning for trustworthy AI. Seeking a Summer 2026 Research Internship to apply expertise in Uncertainty Quantification and Bayesian Modeling to solve challenging real-world problems. Proven experience in developing novel algorithms from theory to implementation in vision and language tasks.

EDUCATION

Rensselaer Polytechnic Institute (RPI) 08/2024 – Present

- **Ph.D.** in **Computer & System Engineering**
- **Advisor:** Prof. Qiang Ji
- **Research Interests:** Uncertainty Quantification, Bayesian Deep Learning, Trustworthy AI, Knowledge-augmented Bayesian Deep Learning

Southern University of Science and Technology (SUSTech) 08/2020 – 07/2024

- **B.S.** in **Data Science and Big Data Technology**
- **Advisor:** Prof. Chao Wang

University of California, Irvine 03/2023 – 07/2023

- **Exchange Student**
- **Courses**: Stochastic Process, Optimization, Independent Study on Meta Learning and Reinforcement Learning

PUBLICATIONS & MANUSCRIPTS

1. **Black-Box Uncertainty Quantification for Large Language Models via Ensemble-of-Ensembles**
   Wang Ma, Debarun Bhattacharjya, Junkyu Lee, Nhan Pham, Harsha Kokel, Qiang Ji.
   Accepted to AAAI 2026 Workshop on AI Reliability, Faithfulness, and Safety (AIR-FM).
2. **Towards Knowledge-augmented Bayesian Deep Learning For Computer Vision**
   Wang Ma, Hanjing Wang, Yufei Zhang, Darsha Udayanga, Qiang Ji.
   Submitted to IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026.
3. **Causal Saliency Map For Post-hoc Model Explanation**
   Hanjing Wang, **Wang Ma**, Naiyu Yin, Qiang Ji.
   Submitted to IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026.

INDUSTRIAL EXPERIENCE

Research Extern 05/2025 – 08/2025
IBM Research *Yorktown Heights, NY*

- **Mentor:** Dr. Debarun Bhattacharjya
- **Project:** Uncertainty Quantification and Reasoning with Large Language Models.
- Developed a novel perturbation-based framework for UQ in black-box LLMs, enabling uncertainty decomposition without requiring access to model weights or intermediate results.
- Introduced an "ensemble-of-ensembles" method to disentangle aleatoric and epistemic uncertainty, using input perturbations as a proxy for parameter variability.
- **Outcome:** First-authored paper accepted to AAAI 2026 AIR-FM Workshop; currently extending for a main conference submission.

ACADEMIC EXPERIENCE

Graduate Research Assistant 09/2024 – Present
Rensselaer Polytechnic Institute (RPI) Troy, NY

- **Advisor:** Prof. Qiang Ji
- **Knowledge-Augmented Bayesian Deep Learning (Submitted to CVPR, First Author):** Proposed a two-stage framework that learns a knowledge-induced prior and an adaptive knowledge likelihood. Demonstrated superior accuracy, robustness, and OOD detection under domain shifts in MNIST/CIFAR datasets and real-world 3D hand reconstruction tasks.
- **Causal Saliency Maps (Submitted to CVPR, Second Author):** Led the implementation of core algorithms for a Causal Markov Blanket (CMB) detection method. Utilized label-wise mutual information to identify causally relevant features, effectively filtering out spurious correlations in vision models.
- **Semantic Uncertainty Disentanglement:** Developed a contrastive learning framework to disentangle semantic and nuisance uncertainties, achieving state-of-the-art performance on multiple benchmarks. (Technical Report)
- **Efficient Single-Model UQ:** Derived theoretical results from NTK theory to quantify regression uncertainty using only one auxiliary neural network. Implemented and advanced credal interval-based methods for practical uncertainty quantification. (Technical Report)

Undergraduate Researcher 03/2024 – 08/2024
SUSTech *Shenzhen, China*

- **Advisor:** Prof. Chao Wang
- Designed and implemented a self-supervised hyperspectral image restoration method using a novel combination of Implicit Neural Representations (INR) and Diffusion Models.
- Optimized a Variational Autoencoder (VAE) for unpaired image denoising, enhancing performance through Mutual Information maximization.

ACADEMIC ENGAGEMENT

Seminar Organizer: AI: Optimization, Theory & Responsibility 07/2024 – 09/2024
SUSTech *Shenzhen, China*

- Organized a graduate-level seminar under the supervision of Prof. Chao Wang.
- Presented talks on Bayesian Optimization and Bayesian Neural Networks.

Seminar Participant & Speaker 06/2023 – 09/2023
SUSTech *Shenzhen, China*

- Delivered presentations on Meta-Learning and Optimizers for a Self-Supervised Learning seminar.

SKILLS

Languages	Mandarin Chinese (Native), English (Fluent), Japanese (Conversational)
Programming	Python (PyTorch, NumPy, Pandas, Scikit-learn), Java, MATLAB
Developer Tools	Git, Docker, LaTeX, Linux

AWARDS & HONORS

SUSTech Excellent Undergraduate Graduation Project 06/2024
Thesis: End-to-end Unpaired Image Denoising Based on Mutual Information Enhancement

Second Prize in Guangdong Province, Mathematical Contest in Modeling 10/2021

Excellent Student Scholarship (Two-time recipient) 2021, 2022