

Yue Zhuo, Ph.D.

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RESEARCH INTERESTS

Trustworthy and explainable AI; Feature attribution and model interpretation; Adversarial robustness and formal verification; Probabilistic modeling; Computer vision and agentic AI; Applications in manufacturing, energy, and science.

PERSONAL PROFILE

Schmidt AI in Science Postdoctoral Fellow at Cornell University whose research centers on trustworthy and explainable AI. I develop methods for feature attribution and model interpretation, adversarial robustness, formal verification, and uncertainty-aware evaluation. My explainability research includes *IG²* and ABIGX, published in TPAMI. Manufacturing, energy, and plant science provide application settings for this methodological work, from explainable fault diagnosis to remote-sensing analysis and 3D reconstruction. My goal is to connect reliable model behavior with evidence that domain experts can interpret and validate.

EDUCATION

Zhejiang University , Hangzhou, China Ph.D. in Control Science and Engineering Thesis: <i>Research on the Reliability of Data-driven Fault Diagnosis Models in Industrial Systems</i>	2018–2023
Zhejiang University of Technology , Hangzhou, China B.Eng. in Automation and Electrical Engineering	2014–2018

EXPERIENCE

Cornell University , Ithaca, NY, USA <i>Schmidt AI in Science Postdoctoral Fellow, College of Engineering</i>	2025–present
• Develop trustworthy scientific AI and integrated perception workflows, emphasizing failure analysis, uncertainty-aware evaluation, domain adaptation, and feedback from domain experts. • Apply computer vision, foundation models, and geospatial analysis to energy systems, including rooftop-PV mapping, adoption pathways, border-city comparisons, and longitudinal deployment analysis across U.S. metropolitan areas. • Develop scientific perception and agentic workflows for plant science, including single-image 3D phenotyping and reconstruction using depth estimation, segmentation, and geometry-aware modeling.	
Nanyang Technological University , Singapore <i>Postdoctoral Research Fellow, School of Electrical and Electronic Engineering</i>	2024
• Studied robustness, failure modes, and reliable decision-making in multi-agent reinforcement learning under perturbations and environment shifts. • Collaborated with Continental on multi-robot planning for warehouse operations, connecting robust learning with an industrial application.	
Zhejiang University , Hangzhou, China <i>Ph.D. Researcher, Control Science and Engineering</i>	2018–2023
• Developed general explainable AI methods for feature attribution and model interpretation, including <i>IG²</i> and ABIGX (TPAMI), with manufacturing fault diagnosis as an application. • Developed MILP-based verification and optimization-based defenses for data-driven models under adversarial perturbations, data scarcity, and distribution shift. • Applied Bayesian optimization to competing safety and accuracy objectives and studied data-driven Bayesian networks for industrial process analytics.	

FELLOWSHIPS & FUNDING

Schmidt AI in Science Postdoctoral Fellowship , Cornell University	2025–present
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PUBLICATIONS

1. **Y. Zhuo** and Z. Ge, “IG2: Integrated Gradient on Iterative Gradient Path for Feature Attribution,” *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2024.
2. **Y. Zhuo**, J. Qian, J. Zheng, X. Jiang, Z. Song, D. Chen, W. Yu, and Z. Ge, “ABIGX: A unified framework for eXplainable fault detection and classification,” *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2026.
3. **Y. Zhuo** and F. You, “AI-enabled remote sensing reveals two urban rooftop PV adoption pathways: household vs. large-roof,” *Applied Energy*, vol. 426, Art. no. 128766, 2026.
4. **Y. Zhuo**, Z. Song, and Z. Ge, “Security versus accuracy: Trade-off data modeling to safe fault classification systems,” *IEEE Transactions on Neural Networks and Learning Systems*, 2023.

5. **Y. Zhuo** and Z. Ge, “Adversarial security verification of data-driven FDC systems,” *IEEE Transactions on Reliability*, 2022.
6. J. Zheng, **Y. Zhuo**, et al., “Advances in Bayesian networks for industrial process analytics: Bridging data and mechanisms,” *Expert Systems with Applications*, 2025.
7. **Y. Zhuo** and F. You, “3D plant phenotyping from a single image: learning fine-scale organ morphology with monocular depth estimation,” *Computers and Electronics in Agriculture*, 2025.
8. **Y. Zhuo** and F. You, “MIRAGE: Biomechanically interpretable 3D generation and reconstruction of maize plants,” *Computers and Electronics in Agriculture*, 2026.
9. **Y. Zhuo** and Z. Ge, “Auxiliary information-guided industrial data augmentation for any-shot fault learning and diagnosis,” *IEEE Transactions on Industrial Informatics*, 2021.
10. **Y. Zhuo** and Z. Ge, “Attack and defense: Adversarial security of data-driven FDC systems,” *IEEE Transactions on Industrial Informatics*, 2022.
11. **Y. Zhuo**, YAW Shardt, and Z. Ge, “One-variable attack on the industrial fault classification system and its defense,” *Engineering*, 2022.
12. **Y. Zhuo** and Z. Ge, “Data guardian: A data protection scheme for industrial monitoring systems,” *IEEE Transactions on Industrial Informatics*, 2021.
13. **Y. Zhuo** and Z. Ge, “Gaussian discriminative analysis aided GAN for imbalanced big data augmentation and fault classification,” *Journal of Process Control*, 2020.
14. J. Zheng, J. Wang, L. Ye, and **Y. Zhuo**, “Semi-supervised convolutional generative adversarial networks for dynamic fault classification with manifold regularization,” *Process Safety and Environmental Protection*, 2025.
15. X. Jiang, C. Zheng, **Y. Zhuo**, et al., “Advancing Industrial Data Augmentation in AIGC Era: from Foundations to Frontier Applications,” *IEEE Transactions on Instrumentation and Measurement*, 2025.
16. X. Zhang, B. Chen, **Y. Zhuo**, Z. Song, and X. Zhang, “Contrastive-based bi-update class incremental model and its application in fault diagnosis,” *IEEE Sensors Journal*, 2024.
17. Z. Yin, **Y. Zhuo**, and Z. Ge, “Transfer adversarial attacks across industrial intelligent systems,” *Reliability Engineering & System Safety*, 2023.

Book Chapter

1. Z. Ge, **Y. Zhuo**, and Z. Song, “On Security of Data-Driven FDC Systems: Attack, Defense, and Verification,” in *Process Monitoring, Fault Diagnosis, and Tolerant Control for Complex Industrial Systems: A Festschrift in Honor of Professor Steven X. Ding on the Occasion of His Retirement*. Singapore: Springer Nature Singapore, 2025, pp. 145–191.

Manuscripts

1. **Y. Zhuo** and Z. Ge, “Feature augmentation for adversarial robustness,” submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2026.
2. **Y. Zhuo** and F. You, “Border cities reveal how rooftop solar opportunity becomes urban deployment,” under review at *Nature Communications*, 2026. [\[GitHub\]](#)
3. **Y. Zhuo** and F. You, “Stock and flow structure of rooftop solar across US metropolitan areas,” submitted to *Nature Cities*, 2026. [\[GitHub\]](#)

TEACHING

Guest Lecturer, SYSEN 6880: Deep Learning, Cornell University

Two semesters

Delivered guest lectures on *Explainable AI* (feature attribution, Shapley-based explanations, counterfactuals) and *Advancing Computer Vision* (vision transformers, semantic segmentation, 3D reconstruction).

PROFESSIONAL SERVICE

Peer Reviewer for Journals: *IEEE Transactions on Industrial Informatics*; *IEEE Transactions on Automatic Control*; *IEEE Transactions on Systems, Man, and Cybernetics: Systems*; *Scientific Reports*; *IFAC Journal of Systems and Control*; *Pattern Recognition*.