Yakun Ju

Contact Information

School of Computing and Mathematical Sciences
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Research Interests

Photometric Stereo
3D Reconstruction
Computational Imaging
Medical Image Processing
Underwater Information Perception

Education

- 2022 Doctor of Philosophy (Computer Science), Ocean University of China, China
  with Thesis: "Deep Learning Models for Non-Lambertian Photometric Stereo"
  Joint-training PhD with The Hong Kong Polytechnic University, Hong Kong SAR
- 2016 Bachelor of Engineering (Industrial Design), Sichuan University, China

Employment History

- **From 11/2024: Assistant Professor (UK Lecturer), School of Computing and Mathematical Sciences, University of Leicester, United Kingdom**
- 09/2023 – 11/2024: Research Fellow, ROSE Lab, School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore
- 09/2022 – 09/2023: Postdoctoral Fellow, Department of Electronic and Information Engineering, The Hong Kong Polytechnic University, Hong Kong SAR

Publications

Peer Reviewed Journal Articles (* corresponding author)

2025

Ju, Y., Shi, B., Wen, B., Lam, K.M., Jiang, X., Kot, A.C. (2025). Revisiting One-stage Deep Uncalibrated Photometric Stereo via Fourier Embedding. *IEEE Transactions on Pattern Analysis and Machine Intelligence* .

Ju, Y., Xiao, J., Zhang, C., Xie, H., Luo, A., Zhou, H., Dong, J., Kot, A.C. (2025). Towards marine snow removal with fusing Fourier information. *Information Fusion*.

Yang, Y., Lam, K.M., Dong, J., **Ju, Y***. (2025). Multi-Factor Deep Learning Model for Sea Surface Temperature Forecasting. *Remote Sensing*.

Liu, Y., **Ju, Y.**, Rao, Y., Zhang, S., Fan, H., Qi, L., Dong, J., Gao, F., Yu. H. (2025). Aerial Multi-View Stereo via Adaptive Depth Range Inference and Normal Cues *IEEE Transactions on Geoscience and Remote Sensing*.

Liu, W., Jia, X., Ju, Y., **Ju, Y.**, Jiang, K., Wu, S., Zhong, L., Zhong, X. (2025). Fragrant: Frequency-auxiliary guided relational attention network for low-light action recognition. *The Visual Computer*.

2024

Ju, Y., Lam, K.M., Xie, W., Zhou, H., Dong, J., Shi, B. (2024). Deep learning methods for calibrated photometric stereo and beyond. *IEEE Transactions on Pattern Analysis and Machine Intelligence*.

Ju, Y., Li, L., Zhong, X., Rao, Y., Liu, Y., Dong, J., Kot, A.C. (2024). Underwater Surface Normal Reconstruction via Cross-Grained Photometric Stereo Transformer. *IEEE Journal of Oceanic Engineering*.

Ju, Y., Zhou, J., Zhou, S., Xie, H., Zhang, C., Xiao, J., Yang, C., Sun, J. (2024). Three-dimensional reconstruction of underwater side-scan sonar images based on shape-from-shading and monocular depth fusion. *Intelligent Marine Technology and Systems*.

Yang, Y., **Ju, Y.***, Gao, Y., Zhang, C., Lam, K.M. (2024). Remote sensing insights into ocean fronts: A literature review. *Intelligent Marine Technology and Systems*.

Yang, Y., Gao, Y., Sun, X., **Ju, Y.**, Zhang, C., Lam, K.M. (2024). A comprehensive dataset for dynamic analysis of ocean front. *Intelligent Marine Technology and Systems*.

Luo, A., Cai, R., Kong, C., **Ju, Y.**, Kang, X., Huang, J., Life, A.C.K. (2024). Forgery-aware Adaptive Learning with Vision Transformer for Generalized Face Forgery Detection. *IEEE Transactions on Circuits and Systems for Video Technology*.

Lin, X., Tang, W., Wang, H., Liu, Y., **Ju, Y.**, Wang, S., Yu, Z. (2024). Exposing image splicing traces in scientific publications via uncertainty-guided refinement. *Patterns*.

2023

Ju, Y., Shi, B., Chen, Y., Zhou, H., Dong, J., Lam, K.M. (2023). GR-PSN: Learning to estimate surface normal and reconstruct photometric stereo images. *IEEE Transactions on Visualization and Computer Graphics*.

Ju, Y., Jian, M., Wang, C., Zhang, C., Dong, J., Lam, K.M. (2023). Estimating high-resolution surface normals via low-resolution photometric stereo images. *IEEE Transactions on Circuits and Systems for Video Technology*. **ESI Highly Cited Paper**

Zhang, C., Su, J., **Ju, Y.**, Lam, K.M., Wang, Q. (2023). Efficient inductive vision transformer for oriented object detection in remote sensing imagery. *IEEE Transactions on Geoscience and Remote Sensing*. **ESI Highly Cited Paper**

Jian, M., Lu, X., Yu, X., **Ju, Y.**, Yu, H., Lam, K.M. (2023). Flow-Edge-Net: Video saliency detection based on optical flow and edge-weighted balance loss. *IEEE Transactions on Computational Social Systems*.

Luo, K., **Ju, Y.**, Qi, L., Wang, K., Dong, J. (2023). RMAFF-PSN: A residual multi-scale attention feature fusion photometric stereo network. *Photonics*.

Rao, Y., **Ju, Y.**, Li, C., Rigall, E., Yang, J., Fan, H., Dong, J. (2023). Learning general descriptors for image matching with regression feedback. *IEEE Transactions on Circuits and Systems for Video Technology*.

Rao, Y., **Ju, Y.**, Wang, S., Gao, F., Fan, H., Dong, J. (2023). Learning enriched feature descriptor for image matching and visual measurement. *IEEE Transactions on Instrumentation and Measurement*.

2022

Ju, Y., Shi, B., Jian, M., Qi, L., Dong, J., Lam, K.M. (2022). Normattention-PSN: A high-frequency region enhanced photometric stereo network with normalized attention. *International Journal of Computer Vision*.

Ju, Y., Peng, Y., Jian, M., Gao, F., Dong, J. (2022). Learning conditional photometric stereo with high-resolution features. *Computational Visual Media*.

Liu, Y., **Ju, Y.***, Jian, M., Gao, F., Rao, Y., Hu, Y., Dong, J. (2022). A deep-shallow and global–local multi-feature fusion network for photometric stereo. *Image and Vision Computing*.

Guo, S., Rigall, E., **Ju, Y.**, Dong, J. (2022). 3D hand pose estimation from monocular RGB with feature interaction module. *IEEE Transactions on Circuits and Systems for Video Technology*.

Rao, Y., Yang, J., **Ju, Y.**, Li, C., Rigall, E., Fan, H., Dong, J. (2022). Learning general feature descriptor for visual measurement with hierarchical view consistency. *IEEE Transactions on Instrumentation and Measurement*.

2021 and earlier

Ju, Y., Dong, J., Chen, S. (2021). Recovering surface normal and arbitrary images: A dual regression network for photometric stereo. *IEEE Transactions on Image Processing*.

Ju, Y., Jian, M., Guo, S., Wang, Y., Zhou, H., Dong, J. (2021). Incorporating lambertian priors into surface normals measurement. *IEEE Transactions on Instrumentation and Measurement*.

Ju, Y., Dong, X., Wang, Y., Qi, L., Dong, J. (2020). A dual-cue network for multispectral photometric stereo. *Pattern Recognition*.

Ju, Y., Qi, L., He, J., Dong, X., Gao, F., Dong, J. (2020). MPS-Net: Learning to recover surface normal for multispectral photometric stereo. *Neurocomputing*.

Ju, Y., Qi, L., Zhou, H., Dong, J., Lu, L. (2018). Demultiplexing colored images for multispectral photometric stereo via deep neural networks. *IEEE Access*.

Fan, H., Qi, L., **Ju, Y.**, Dong, J., Yu, H. (2017). Refractive laser triangulation and photometric stereo in underwater environment. *Optical Engineering*.

Peer Reviewed Conference Articles (* corresponding author)

2025

Leng, J., **Ju, Y.***, Duan, Y., Zhang, J., Lv, Q., Wu, Z., Fan, H. (2025). FNIN: A Fourier Neural Operator-based Numerical Integration Network for Surface-from-gradients. *Proceedings of the AAAI Conference on Artificial Intelligence*.

Zhu, L., **Ju, Y.**, Gao, Y. (2025). A novel stereo matching network for underwater scenes. *Proceedings of the IEEE International Symposium on Circuits and Systems*.

Li, L., Guo, L., Yang, S., Zheng, Q., **Ju, Y.**, Lin, W., Kot, A.C. (2025). HRHuman: Tuning-free higher-resolution human image generation via template knowledge. *Proceedings of the IEEE International Symposium on Circuits and Systems*.

2024

Xie, H., Huang, Z., Leung, F.H.F., Law, N.F., **Ju, Y.***, Zheng, Y.P., Ling, S.H. (2024). Satr: A structure-affinity attention-based transformer encoder for spine segmentation. *Proceedings of the IEEE International Symposium on Biomedical Imaging*.

Xiao, J., Lyu, Z., Zhang, C., **Ju, Y.**, Shui, C., Lam, K.M. (2024). Towards progressive multi-frequency representation for image warping. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*.

Xiao, J., Lyu, Z., Xie, H., Zhang, C., **Ju, Y.**, Shui, C., Lam, K.M. (2024). Frequency-aware guidance for blind image restoration via diffusion models. *Proceedings of the European Conference on Computer Vision Workshops*.

Wang, K., Qi, L., Qin, S., Luo, K., **Ju, Y.**, Li, X., Dong, J. (2024). Image gradient-aided photometric stereo network. *Proceedings of the Pacific Rim International Conference on Artificial Intelligence*.

Zhang, C., **Ju, Y.**, Xiao, J., Yang, Y., Lam, K.M. (2024). Aligning localization and classification for anchor-free object detection in aerial imagery. *Proceedings of the International Workshop on Advanced Imaging Technology*.

Xiao, J., Yang, C., Zhang, C., **Ju, Y.**, Lam, K.M. (2024). Dynamic spatial aggregation network for joint denoising and HDR imaging. *Proceedings of the International Workshop on Advanced Imaging Technology*.

2023

Ju, Y., Lam, K.M., Xiao, J., Zhang, C., Yang, C., Dong, J. (2023). Efficient feature fusion for learning-based photometric stereo. *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing*.

Ju, Y., Zhang, C., Huang, S., Rao, Y., Lam, K.M. (2023). Learning deep photometric stereo network with reflectance priors. *Proceedings of the IEEE International Conference on Multimedia and Expo*.

Ju, Y., Jian, M., Zhang, C., Hu, Y., Lam, K.M. (2023). Deep discrete wavelet transform network for photometric stereo. *Proceedings of the International Conference on Digital Signal Processing*.

Xie, H., Huang, Z., Leung, F.H.F., **Ju, Y.***, Zheng, Y.P., Ling, S.H. (2023). A structure-affinity dual attention-based network to segment spine for scoliosis assessment. *Proceedings of the IEEE International Conference on Bioinformatics and Biomedicine*.

Xie, W., Wang, K., **Ju, Y.**, Wang, M. (2023). PMBQA: Projection-based blind point cloud quality assessment via multimodal learning. *Proceedings of the ACM International Conference on Multimedia*.

Zhang, C., Liu, T., **Ju, Y.**, Lam, K.M. (2023). Pyramid masked image modeling for transformer-based aerial object detection. *Proceedings of the IEEE International Conference on Image Processing*.

Yang, C., Xiao, J., **Ju, Y.**, Qiu, G., Lam, K.M. (2023). Improving robustness of single image super-resolution models with Monte Carlo method. *Proceedings of the IEEE International Conference on Image Processing*.

Wang, C., Pan, J., Wang, W., Dong, J., Wang, M., **Ju, Y.**, Chen, J. (2023). Promptrestorer: A prompting image restoration method with degradation perception. *Advances in Neural Information Processing Systems*.

2022 and earlier

Ju, Y., Lam, K.M., Chen, Y., Qi, L., Dong, J. (2020). Pay attention to devils: A photometric stereo network for better details. *Proceedings of the International Joint Conference on Artificial Intelligence*.

Ju, Y., Jian, M., Dong, J., Lam, K.M. (2020). Learning photometric stereo via manifold-based mapping. *Proceedings of the IEEE International Conference on Visual Communications and Image Processing*.

Wang, Y., **Ju, Y.**, Jian, M., Lam, K.M., Qia, L., Dong, J. (2020). Self-supervised depth completion with attention-based loss. *Proceedings of the International Workshop on Advanced Imaging Technology*.

Ju, Y., Qi, L., Fan, H., Lu, L., Dong, J. (2018). Photometric stereo via random sampling and tensor robust principal component analysis. *Proceedings of the International Conference on Graphic and Image Processing*.

Granted Patents

Ju, Y., Dong, J., Qi, L., Lu, L. A single frame image 3D reconstruction device and method based on deep learning. *China Invention Patent*.

Ju, Y., Dong, J., Gao, F. High-frequency region enhancement photometric stereo method based on deep learning. *China Invention Patent*.

Ju, Y., Dong, J., Qi, L. Multispectral photometric stereo surface normal recovery method based on deep learning. *China Invention Patent*.

Jian, M., Wang, R., Wang, X., **Ju, Y.**, et al. A transformer-based face image super-resolution method. *China Invention Patent*.

Jian, M., Chen, H., Wang, R., **Ju, Y.**, et al. A method for grading diabetic retinopathy based on a three-stage attention network. *China Invention Patent*.

Jian, M., Wang, R., Wang, X., Chen, J., **Ju, Y.**, et al. Low-resolution face super-resolution and recognition method based on facial prior knowledge. *China Invention Patent*.

Jian, M., Wang, R., Wang, X., Li, C., **Ju, Y.**, et al. Mixed facial component recognition method based on non-uniform illumination face image enhancement. *China Invention Patent*.

Academic Activities

Associate Editor / Editorial Board

Applied Soft Computing (From 02/2025)

Neurocomputing (From 01/2025)

Frontiers in Marine Science (From 03/2025)

Intelligent Marine Technology and Systems (From 12/2023)

Guest Editor

Pattern Recognition, *Special Issue: Advances in Multimodal-Driven Video Understanding and Assessment* (04-11/2025)

Computer Vision and Image Understanding, *Special Issue: Advanced Computational Imaging and Photography Measurement* (03-09/2025)

Frontiers in Marine Science, *Special Issue: Underwater Visual Signal Processing in the Data-Driven Era* (10/2024-04/2025)

Remote Sensing, *Special Issue: Remote Sensing Techniques for 3D Reconstruction and Multimodal Structural Analysis* (01-07/2025)

Conference chair

International Conference on Intelligent Data Analytics and Sustainable Systems (2025), *Conference Program Co-Chair*

International Conference on Intelligent Data Analytics and Sustainable Systems (2024), *Conference Program Co-Chair*

IEEE International Conference on Multimedia and Expo (2023), *Session Chair*

Workshop Organizer

IEEE International Conference on Multimedia and Expo (2025), Multimedia in Underwater Information Processing and Exploration. *Workshop Chair*

ACM Multimedia (2025), Multimedia Computing for Health and Medicine. *Workshop Program Committee*

IEEE International Conference on Image Processing (2024), AI for Image Processing Applications on Traffic: Advancements, Challenges, and Opportunities. *Workshop Program Committee*

Reviewer

Journal: IEEE Transactions on Image Processing, IEEE Transactions on Visualization and Computer Graphics, IEEE Transactions on Multimedia, IEEE Transactions on Circuits and Systems for Video Technology, IEEE Transactions on Consumer Electronics, IEEE Transactions on Industrial Electronics, IEEE Transactions on Computational Imaging, IEEE Transactions on Vehicular Technology, IEEE Journal of Selected Topics in Signal Processing, IEEE Journal of Oceanic Engineering, International Journal of Computer Vision, Engineering Applications of Artificial Intelligence, Optics and Lasers in Engineering, Neurocomputing, Applied Soft Computing, Knowledge-Based Systems, Signal Processing: Image Communication, Neural Computing and Applications, Multimedia Tools and Applications, Computers Materials & Continua, Optics Express, Optical Engineering, Ocean Engineering, Machine Intelligence Research, etc.

Conference: Conference on Computer Vision and Pattern Recognition, International Conference on Computer Vision, ACM Multimedia, International Joint Conference on Artificial Intelligence, International Conference on Medical Image Computing and Computer Assisted Intervention, International Workshop on Advanced Imaging Technology, IEEE International Conference on Multimedia and Expo, International Conference on Acoustics Speech and Signal Processing, IEEE International Conference on Image Processing, etc.

Tutorial and Talk

Ju, Y. (2025) Deep Learning in Medical Image Analysis: Photometric Stereo for Fundus Reconstruction. *University of Leicester, UK*.

Ju, Y. (2024) Implicit GBR Ambiguity Solution in Deep Uncalibrated Photometric Stereo. *Ocean University of China, China*.

Ju, Y. (2024) Photometric Stereo: A dense shape recovery method. *Huazhong University of Science and Technology, China*.

Ju, Y. (2023) Deep Learning-based Calibrated Photometric Stereo: Review & Future. *China 3DV Conference, China*.

Ju, Y. (2023) Recovering surface normal and rerendering images: A dual regression photometric stereo framework. *Shandong Artificial Intelligence Conference, China*.

Ju, Y. (2022) Data-Driven Photometric Stereo. *Shenzhen University, China*.

Ju, Y. (2021) Recent Progress in Data-Driven Photometric Stereo. *CCF China Intelligent Robot Academic Annual Conference, China*.

Teaching

CO4210/7210: Personal and Group Skills, University of Leicester, 2024-2025 SEM2

CO2302: Software Engineering Group Project, University of Leicester, 2024-2025 SEM2

CO7201: MSc Individual Project, University of Leicester, 2024-2025 SEM2

CO3201: Computer Science Project, University of Leicester, 2024-2025 Y

CO3204: Software Engineering Project, University of Leicester, 2024-2025 Y

Supervision

Dr. Ju is (co)supervising one doctoral and four master students at University of Leicester.

Awards

- 2022 ACM China Council Qingdao Chapter Outstanding Doctoral Dissertation Award
- 2022 Outstanding Graduates of Shandong Province
- 2021 Inspur Scholarship
- 2020 National Scholarship for Doctoral Students
- 2017 Goers Acoustic Scholarship

Grants

- 2024 Research Direct Grant, **PI**
  University of Leicester ($5,000 GBP, Approx. 6,700 USD)

- 2024 Research on Key Technologies of a Lightweight Digital Twin for Dense 3D Surface Based on Normal Map, **Co-PI**
  National Natural Science Foundation of China ($500,000 CNY, Approx. 69,400 USD)

Appendix: Biography

Yakun Ju has been an Assistant Professor (UK Lecturer) in the School of Computing and Mathematical Sciences at the University of Leicester, United Kingdom, since 2024. He is affiliated with the university's Artificial Intelligence and Machine Learning research group, led by Prof. Huiyu Zhou. Since 2024, he has served as a chair or program committee member for major international conferences such as IEEE ICME, ACM Multimedia, and IEEE ICIP. He also serves as an Associate Editor or Guest Editor for several leading journals, including Applied Soft Computing, Neurocomputing, Pattern Recognition, and Computer Vision and Image Understanding. He is currently a member of the IEEE Signal Processing Society.

Dr. Ju was born in Qingdao, Shandong, China. Before moving to the UK, he worked as a Research Fellow in the ROSE Lab at Nanyang Technological University, Singapore (2023–2024), collaborating with Prof. Alex C. Kot (SAEng, IEEE Life Fellow). Prior to that, he was a Postdoctoral Fellow at The Hong Kong Polytechnic University (2022–2023), working with Prof. Kenneth Kin-Man Lam (Vice President, IEEE Signal Processing Society).

Dr. Ju received his Ph.D. in Computer Science from Ocean University of China in 2022, with joint research training at the Department of Electrical and Electronic Engineering, The Hong Kong Polytechnic University. His doctoral advisors were Prof. Junyu Dong and Prof. Kenneth Kin-Man Lam. He was honored with the ACM China Council Qingdao Chapter Outstanding Doctoral Dissertation Award (2022) and the National Scholarship for Doctoral Students (2020).

Dr. Ju's research interests include 3D reconstruction, photometric stereo, computational imaging, and underwater visual perception. His work focuses on the development of efficient, physically grounded, and learning-based methods for dense geometry recovery and reflectance analysis under challenging visual environments, such as underwater or medical scenes. His recent research also explores cross-modality and data-driven computational sensing, aiming to bridge physics-informed vision with AI-based perceptual modeling for real-world applications. In these areas, Dr. Ju has authored over 60 peer-reviewed publications in top-tier journals and conferences, including TPAMI, TVCG, TIP, IJCV, NeurIPS, CVPR, etc. He is also the inventor of multiple China national patents on deep learning-based 3D surface reconstruction, which have supported technology transfer applications exceeding 400,000 CNY (approximately 55,000 USD).