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Education

Ph.D. in Computer Science, University of Rochester, 2018 - 2023.

Advisor: Prof. Jiebo Luo

M.S. in Computer Science, University of Rochester, 2018 - 2020.

M.S. in Electronics and Communication Engineering, University of Science and Technology of China, 2013 - 2016.

B.S. in Electronic Information Engineering, University of Science and Technology of China, 2009 - 2013.

Research Interests

I am interested in computer vision and graphics problems such as image generation, editing, enhancement, restoration and computer aided digital art creation.

Working Experience

Research Scientist 2 at Adobe Research, San Jose, CA, USA, 2025.2 - present

Research Scientist at Adobe Research, San Jose, CA, USA, 2023.7 - 2025.2

Ph.D. at University of Rochester, USA, 2018.9 - 2023.7

Research Intern at Adobe Co., Ltd., San Jose, USA, 2022.5 - 2022.9

Research Intern at Adobe Co., Ltd., San Jose, USA, 2021.5 - 2021.9

Research Intern at Adobe Co., Ltd., San Jose, USA, 2020.5 - 2020.9

Visiting Student at Tsinghua University, Beijing, China, 2015.9 - 2016.1.

Visiting Student at Singapore University of Technology and Design, Singapore, 2013.11 - 2014.9.

Patents

Issued

H. Zheng, J. Zhang, L. Figueroa, S. Cohen, S. Y. Kim, T. Wang, W. Xiong, Z. Lin, Z. Ding, "Joint Framework for Object-centered Shadow Detection, Removal, and Synthesis," U.S. Patent No. 12,626,429, issued May 12, 2026 (filed Apr. 30, 2024; Application No. 18/651,376).

C. Barnes, E. Shechtman, **H. Zheng**, Q. Liu, S. Amirghodsi, Y. Zhou, Z. Lin, "Deep Learning-based High-resolution Image Inpainting," U.S. Patent No. 12,602,755, issued Apr. 14, 2026 (filed Aug. 9, 2023; Application No. 18/232,212).

E. Shechtman, **H. Zheng**, J. Zhang, J. Lu, N. Xu, Q. Liu, S. Cohen, S. Amirghodsi, Z. Lin, "Panoptically Guided Inpainting Utilizing a Panoptic Inpainting Neural Network," U.S. Patent No. 12,505,518, issued Dec. 23, 2025 (filed Oct. 3, 2022; Application No. 17/937,695).

C. Barnes, E. Shechtman, **H. Zheng**, J. Zhang, J. Lu, Q. Liu, S. Cohen, S. Amirghodsi, Y. Zhou, Z. Lin, "Image and Object Inpainting with Diffusion Models," U.S. Patent No. 12,430,727, issued Sep. 30, 2025 (filed Nov. 22, 2022; Application No. 18/058,027).

C. Barnes, E. Shechtman, **H. Zheng**, J. Zhang, J. Lu, N. Xu, S. Cohen, S. Amirghodsi, Z. Lin, "Object Class Inpainting in Digital Images Utilizing Class-specific Inpainting Neural Networks," U.S. Patent No. 12,430,725, issued Sep. 30, 2025 (filed May 13, 2022; Application No. 17/663,317).

E. Shechtman, **H. Zheng**, J. Zhang, J. Lu, N. Xu, Q. Liu, S. Cohen, S. Amirghodsi, Z. Lin, "Learning Parameters for Neural Networks Using a Semantic Discriminator and an Object-level Discriminator," U.S. Patent No. 12,367,586, issued Jul. 22, 2025 (filed Oct. 3, 2022; Application No. 17/937,680).

Z. Lin, E. Shechtman, **H. Zheng**, J. Zhang, J. Lu, N. Xu, Q. Liu, S. Cohen, S. Amirghodsi, "Generating and Providing a Panoptic Inpainting Interface for Generating and Modifying Inpainted Digital Images," U.S. Patent No. 12,367,561, issued Jul. 22, 2025 (filed Oct. 3, 2022; Application No. 17/937,706).

E. Shechtman, **H. Zheng**, J. Zhang, J. Lu, N. Xu, Q. Liu, S. Cohen, S. Amirghodsi, Z. Lin, "Iteratively Modifying Inpainted Digital Images Based on Changes to Panoptic Segmentation Maps," U.S. Patent No. 12,367,562, issued Jul. 22, 2025 (filed Oct. 3, 2022; Application No. 17/937,708).

H. Zheng, J. Zhang, J. Lu, N. Xu, S. Cohen, Z. Lin, "Generating Digital Images Utilizing High-resolution Sparse Attention and Semantic Layout Manipulation Neural Networks," U.S. Patent No. 12,361,512, issued Jul. 15, 2025 (filed Apr. 11, 2023; Application No. 18/298,630).

C. Barnes, E. Shechtman, **H. Zheng**, J. Zhang, J. Lu, N. Xu, S. Cohen, S. Amirghodsi, Z. Lin, "Learning Parameters for Generative Inpainting Neural Networks Utilizing Object-aware Training and Masked Regularization," U.S. Patent No. 12,204,610, issued Jan. 21, 2025 (filed Feb. 14, 2022; Application No. 17/650,967).

C. Barnes, E. Shechtman, **H. Zheng**, J. Zhang, J. Lu, N. Xu, S. Cohen, S. Amirghodsi, Z. Lin, "Digital Image Inpainting Utilizing a Cascaded Modulation Inpainting Neural Network," U.S. Patent No. 12,165,295, issued Dec. 10, 2024 (filed May 4, 2022; Application No. 17/661,985).

H. Zheng, J. Zhang, J. Lu, N. Xu, S. Cohen, Z. Lin, "Generating Digital Images Utilizing High-resolution Sparse Attention and Semantic Layout Manipulation Neural Networks," U.S. Patent No. 11,636,570, issued Apr. 25, 2023 (filed Apr. 1, 2021; Application No. 17/220,543).

Applications

H. Zheng, J. Ren, Z. Zhang, Y. Zhou, C. Barnes, Z. Lin, "Text-to-image Diffusion Models with Cross-latent Diffusion," U.S. Patent App. No. 19/721,534, filed Jun. 26, 2026.

H. Zheng, J. Zhang, L. Figueroa, S. Cohen, S. Y. Kim, T. Wang, W. Xiong, Z. Lin, Z. Ding, "Joint Framework for Object-centered Shadow Detection, Removal, and Synthesis," U.S. Patent App. No. 19/664,872, filed Apr. 30, 2026.

H. Zheng, H. Zhang, J. W. Y. Kuen, Q. Liu, S. Liu, X. Wang, Y. Li, Y. Zhou, Z. Lin, Z. Zhang, "Asymmetric Experts with Mid-layer Bridge for Unified Understanding and Generation," U.S. Patent App. No. 19/657,699, filed Apr. 24, 2026.

D. Pakhomov, **H. Zheng**, L. Xie, Y. Zhou, Z. Lin, Z. Zhang, Z. Wang, Z. Wu, "Few-step Text-to-image Model for Image Inpainting," U.S. Patent App. No. 19/549,433, filed Feb. 25, 2026.

D. Liu, **H. Zheng**, K. K. Singh, Q. Zhang, Y. Kang, Y. Liu, Z. Lin, Z. Ding, "Few-step Video Generation via Distillation and Latent Reward Optimization," U.S. Patent App. No. 19/289,299, filed Aug. 4, 2025.

- C. Barnes, **H. Zheng**, J. Zhang, Y. Yu, Y. Liu, Y. Zhou, Z. Lin, Z. Zhang, "Multi-level Encoders for Image Restoration and Supersampling," U.S. Patent App. No. 19/190,281, filed Apr. 25, 2025.
- H. Zheng**, J. Zhang, J. Lu, K. K. Singh, S. Amirghodsi, Y. Zhou, Z. Lin, "An Advanced Framework for Simulating and Correcting Generative Inpainting Artifacts," U.S. Patent App. No. 19/065,753, filed Feb. 27, 2025.
- H. Zheng**, J. Zhang, J. Lu, S. Amirghodsi, Y. Zhou, Z. Lin, "Adaptive Color Tune Transformation Loss for Enhanced Sensitivity in Generative Models," U.S. Patent App. No. 19/049,830, filed Feb. 10, 2025.
- H. Zheng**, Y. Zhou, Z. Lin, Z. Zhang, "Masked Latent Decoder for Image Inpainting," U.S. Patent App. No. 18/957,817, filed Nov. 24, 2024.
- H. Zheng**, J. Zhang, Z. Lin, Z. Zhang, "Systems and Methods for Efficient Image Generation," U.S. Patent App. No. 18/950,691, filed Nov. 18, 2024.
- C. Barnes, E. Shechtman, **H. Zheng**, J. Zhang, J. Lu, N. Xu, S. Cohen, S. Amirghodsi, Z. Lin, "Digital Image Inpainting Utilizing Global and Local Modulation Layers of an Inpainting Neural Network," U.S. Patent App. No. 18/929,330, filed Oct. 28, 2024.
- H. Zheng**, J. Zhang, Z. Lin, Z. Zhang, "Multi-component Latent Pyramid Space for Generative Models," U.S. Patent App. No. 18/607,813, filed Mar. 18, 2024.

Publication

- Z. Zhou, X. Zhan, Z. Chen, S. Y. Kim, N. Zhao, **H. Zheng**, Q. Liu, H. Zhang, Z. Lin, Y. Zhou, J. Luo, "Tri-Prompting: Video Diffusion with Unified Control over Scene, Subject, and Motion," **arXiv preprint arXiv:2603.15614**, 2026.
- X. Wang, Z. Zhang, H. Zhang, Z. Lin, Y. Zhou, Q. Liu, S. Zhang, Y. Li, S. Liu, **H. Zheng**, J. Kuen, Y. Wang, C. Gao, N. Sang, "HBridge: H-Shape Bridging of Heterogeneous Experts for Unified Multimodal Understanding and Generation," in **IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)**, 2026.
- Y. Yu, **H. Zheng**, Z. Lin, C. Barnes, Y. Zhou, J. Luo, "RealUHR: Harnessing Patch-Cascade Flows for Photorealistic Ultra-High-Resolution Synthesis," in **The 40th Annual AAAI Conference on Artificial Intelligence (AAAI)**, 2025.
- H. Zheng***, Y. Yao*, Y. Yu, Y. Zhou, Z. Lin, J. Luo, "PixPerfect: Seamless Latent Diffusion Local Editing with Discriminative Pixel-Space Refinement," in **The Thirty-Ninth Annual Conference on Neural Information Processing Systems (NeurIPS)**, 2025.
- Y. Yu, Z. Zeng, **H. Zheng**, J. Luo, "Omnipaint: Mastering object-oriented editing via disentangled insertion-removal inpainting," in **IEEE/CVF International Conference on Computer Vision (ICCV)**, 2025.
- Z. Ding, C. Jin, D. Liu, **H. Zheng**, K. Singh, Q. Zhang, Y. Kang, Z. Lin, Y. Liu, "DOLLAR: Few-Step Video Generation via Distillation and Latent Reward Optimization," in **IEEE/CVF International Conference on Computer Vision (ICCV)**, 2025.
- L. Xie, D. Pakhomov, Z. Wang, Z. Wu, Z. Chen, Y. Zhou, **H. Zheng**, Z. Zhang, Z. Lin, J. Zhou, C. Dong, "TurboFill: Adapting Few-step Text-to-image Model for Fast Image Inpainting," in **IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)**, pages 7613–7622, 2025.
- T. Wang, J. Zhang, **H. Zheng**, Z. Ding, S. Cohen, Z. Lin, W. Xiong, C.-W. Fu, L. Figueroa, S. Y. Kim, "MetaShadow: Object-Centered Shadow Detection, Removal, and Synthesis," in **IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)**, 2025.

- Y. Yu, **H. Zheng**, Z. Zhang, J. Zhang, Y. Zhou, C. Barnes, Y. Liu, W. Xiong, Z. Lin, J. Luo, "ZipIR: Latent Pyramid Diffusion Transformer for High-Resolution Image Restoration," **arXiv preprint arXiv:2504.08591**, 2025.
- Z. Liu, Q. Liu, C. Chang, J. Zhang, D. Pakhomov, **H. Zheng**, Z. Lin, D. Cohen-Or, C. Fu, "Object-level Scene Deocclusion", in **ACM SIGGRAPH 2024**, Conference Papers
- H. Zheng**, Z. Lin, J. Lu, S. Cohen, E. Shechtman, J. Zhang, N. Xu, S. Amirghodsi, J. Luo, "Structure-Guided Image Inpainting with Image-level and Object-level Semantic Discriminators," in **IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)**, pages 1-14 (early access), 2024.
- A. Martin, **H. Zheng**, J. An, J. Luo, "Jurassic World Remake: Bringing Ancient Fossils Back to Life via Zero-Shot Long Image-to-Image Translation," in **Proc. of the ACM Multimedia (ACMMM)**, 2023.
- Y. Zhao, **H. Zheng**, Z. Wang, J. Luo, E. Y. Lam, "Point Cloud Denoising via Momentum Ascent in Gradient Fields," in **IEEE International Conference on Image Processing (ICIP)**, 2023.
- Y. Zhao, **H. Zheng**, J. Luo, E. Y. Lam, "Improving Video Colorization by Test-Time Tuning," in **IEEE International Conference on Image Processing (ICIP)**, 2023.
- H. Zheng**, Z. Lin, J. Lu, S. Cohen, E. Shechtman, C. Barnes, J. Zhang, N. Xu, S. Amirghodsi, J. Luo, "Image Inpainting with Cascaded Modulation GAN and Object-Aware Training," in **The European Conference on Computer Vision (ECCV)**, pages 277-296, 2022.
- H. Zheng**, Z. Lin, J. Lu, S. Cohen, J. Zhang, N. Xu, J. Luo, "Semantic Layout Manipulation with High-Resolution Sparse Attention," in **IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)**, pages 1-15 (early access), 2022.
- J Shi, N Xu, **H Zheng**, A Smith, J Luo, C Xu, "SpaceEdit: Learning a Unified Editing Space for Open-Domain Image Color Editing," in **IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)**, pages 19730-19739, 2022.
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- W Zhu, Z Zheng, **H Zheng**, H Lyu, J Luo, "Learning to Aggregate and Refine Noisy Labels for Visual Sentiment Analysis" in **International Conference on Pattern Recognition (ICPR)**, pages 571-577, 2022.
- H. Zheng**, K. Wu, J. Park, W. Zhu, J. Luo, "Personalized Fashion Recommendation from Personal Social Media Data: An Item-to-Set Metric Learning Approach," in **The International Conference on Big Data (IEEE BigData)**, pages 5014-5023, 2021.
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- H. Zheng**, M. Ji, H. Wang, Y. Liu, L. Fang, "CrossNet: An End-to-end Reference-based Super Resolution Network using Cross-scale Warping," **The European Conference on Computer Vision (ECCV)**, pages 88-104, 2018.
- H. Zheng**, M. Ji, Z. Xu, H. Wang, Y. Liu, L. Fang, "Learning Cross-scale Correspondence and Patch-based Synthesis for Reference-based Super-Resolution," **The British Machine Vision Conference (BMVC)**, pages 138.1-138.13, 2017.
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- H. Zheng**, M. Guo, Y. Liu, L. Fang, "Combining Exemplar-based Approach and Learning-based Approach for Light Field Super-resolution Using a Hybrid Imaging System," **The International Conference on Computer Vision workshop (ICCV workshop)**, pages 2481-2486, 2017.
- Z. Xu*, **H. Zheng***, M. Pang, Y. Zhu, X. Su, G. Zhou, L. Fang, "Utilizing High-level Visual Feature for Indoor Shopping Mall Navigation," **IEEE Global Conference on Signal and Information Processing (GlobalSIP)**, pages 1378-1382, 2017.
- H. Zheng**, L. Fang, M. Ji, M. Strese, Y. Oezer, E. Steinbach, "Deep Learning for Surface Material Classification Using Haptic and Visual Information," **IEEE Transactions on Multimedia (TMM)**, vol. 18, pages 2407-2416, 2016.
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- H. Zheng**, G. Cheung, L. Fang, "Analysis of Sports Statistics via Graph-Signal Smoothness Prior," in **Proc. of Asia Pacific Signal and Information Processing Association Annual Summit and Conference (APSIPA-ASC)**, pages 1071-1076, 2015.
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- T. T. Do, Y. Zhou, **H. Zheng**, N. M. Cheung, D. Koh, "Early melanoma diagnosis with mobile imaging," in **Proc. of The 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)**, pages 6752-6757, 2014,

Service

Conference reviewer: Neurips 2026, ECCV 2026, CVPR 2026, ICCV 2025, CVPR 2025, ECCV 2024, ICCV 2023, CVPR 2023, ICLR 2022, AAAI 2022, ECCV 2022, CVPR 2022, WACV 2022, ACMMM 2021

Journal reviewer: IEEE TPAMI, IEEE TIP, IEEE TMM, IEEE TCSVT, IEEE JSTSP

I am selected as one of the *Outstanding Reviewer* for CVPR 2022.