

# Zhexiao Xiong

+1-314-319-2407 | [x.zhexiao@wustl.edu](mailto:x.zhexiao@wustl.edu) | [Linkedin](#) | [Github](#) | [Personal-Webpage](#)

## BIOGRAPHY

I am a fourth-year CS Ph.D. candidate at Washington University in St. Louis(WashU), advised by **Prof. Nathan Jacobs**. My research interests lie in computer vision and multi-modal learning, with a focus on generative models and AIGC-related topics. In particular: (1) Unifying vision understanding and generation, including world models for applications such as autonomous driving; (2) Controllable & personalized image/video generation and editing; (3) Integration of vision-language models (VLMs) with generative modeling; (4) Generative AI for 3D vision, including neural rendering, cross-view synthesis, and novel view synthesis.

## EDUCATION

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|--|---|
| • <b>Washington University in St. Louis</b><br><i>Ph.D. Candidate in Computer Science</i><br>Advisor: <b>Prof. Nathan Jacobs</b> | 2022.08 – 2027.05(Expected)<br>St. Louis, MO, USA |
| • <b>Tianjin University</b><br><i>B.S. in Electrical and Information Engineering</i>   | 2018.09 – 2022.06<br>Tianjin, China               |

## WORK EXPERIENCE

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|--|---|
| • <b>Bosch Research</b> [🌐]<br><i>Research Intern</i><br>◦ Researched on Unified Visual Understanding, Planning and Generation Models for autonomous driving.  | 2025.06 – 2025.09<br>Sunnyvale, CA, USA |
| • <b>OPPO US Research Center</b> [🌐]<br><i>Research Intern</i><br>◦ Researched on text-guided 3D Scene Generation, use Large-language model(LLM)-based dreaming and video generation models to generate both geometric and semantic consistent 3D scene. | 2024.05 – 2024.08<br>Palo Alto, CA, USA |
| • <b>OPPO Research Institute</b> [🌐]<br><i>Research Intern</i><br>◦ Researched on image matting, proposed a framework to use human pose as guidance to achieve whole body matting.   | 2022.02 – 2022.05<br>Beijing, China     |
| • <b>Institute of Automation, Chinese Academy of Sciences(CASIA)</b> [🌐]<br><i>Research Intern</i><br>◦ Researched on model compression and network pruning, especially the application on Vision Transformers.  | 2021.01 – 2022.01<br>Beijing, China     |

## SELECTED PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PRE-PRINT

- [P.1] Zhexiao Xiong, Wei Xiong, Jing Shi, He Zhang, Yizhi Song, Nathan Jacobs. **GroundingBooth: Grounding Text-to-Image Customization**. *Arxiv Pre-print*.
- [C.1] Zhexiao Xiong, Zhang Chen, Zhong Li, Yi Xu, Nathan Jacobs. **PanoDreamer: Consistent Text to 360-Degree Scene Generation**. In *CVPR Workshops (CV4Metaverse)*, 2025.
- [C.2] Wanzhou Liu\*, Zhexiao Xiong\*, Xinyu Li, Nathan Jacobs. **DeclutterNeRF: Generative-Free 3D Scene Recovery for Occlusion Removal**. In *CVPR Workshops (CV4Metaverse)*, 2025.
- [C.3] Feng Qiao, Zhexiao Xiong, Eric Xing, Nathan Jacobs. **GenStereo: Towards Open-World Generation of Stereo Images and Unsupervised Matching**. *International Conference on Computer Vision(ICCV)*, 2025.
- [C.4] Feng Qiao, Zhexiao Xiong, Xinge Zhu, Yuexin Ma, Qiumeng He, Nathan Jacobs. **MCPDepth: Omnidirectional Depth Estimation via Stereo Matching from Multi-Cylindrical Panoramas**. In *IEEE/CVF Winter Conference on Applications of Computer Vision(WACV)*, 2026.
- [C.5] Zhexiao Xiong, Feng Qiao, Yu Zhang, Nathan Jacobs. **StereoFlowGAN: Co-training for Stereo and Flow with Unsupervised Domain Adaptation**. In *British Machine Vision Conference(BMVC)*, 2023.
- [C.6] Xin Xing, Zhexiao Xiong, Abby Stylianou, Srikumar Sastry, Liyu Gong, Nathan Jacobs. **Vision-Language Pseudo-Labels for Single-Positive Multi-Label Learning**. In *CVPR Workshops(CVPRW)*, 2024.
- [C.7] Subash Khanal, Eric Xing, Srikumar Sastry, Aayush Dhakal, Zhexiao Xiong, Adeel Ahmad, Nathan Jacobs. **PSM: Learning Probabilistic Embeddings for Multi-scale Zero-Shot Soundscape Mapping**. In *ACM Multimedia(ACM MM)*, 2024.
- [J.1] Zhexiao Xiong, Xin Xing, Scott Workman, Subash Khanal, Nathan Jacobs. **Mixed-View Panorama Synthesis using Geospatially Guided Diffusion**. *Transactions on Machine Learning Research(TMLR)*, 2025.
- [J.2] Nanfei Jiang, Zhexiao Xiong, Hui Tian, Xu Zhao, Xiaojie Du, Chaoyang Zhao, Jinqiao Wang. **PruneFaceDet: Pruning lightweight face detection network by sparsity training**. *Cognitive Computation and Systems*, 2022.

## PROJECTS

- |  |                   |
|--|-------------------|
| • <b>Unified Understanding, Planning and Generation model for Autonomous Driving</b><br><i>Research Project during internship at Bosch Research</i>  | 2025.06 – present |
| ◦ Developed a <b>world-model</b> -based framework that unifies trajectory planning and autoregressive future image generation, enhanced with Chain-of-Thought reasoning within a single <b>vision-language model (VLM)</b> . |                   |
| ◦ Enabled thinking visually before planning, leading to more accurate and robust decision-making, and demonstrated significant gains on vision-language planning(VLP) benchmarks.  |                   |

- Physically Coherent Video Generation

2025.02 – present

- Proposed a framework that leverages **vision-language model(VLM)**’s physics understanding to enable video generation with physically consistent motion and accurate 3D dynamics.
- Achieved physically plausible video generation by combining relational alignment with foundation video understanding models, physics-aware feature encoding, and 3D geometry alignment.

- Grounded text-to-image Customization

*Collaboration with Adobe Research*

2024.01 – 2024.09



- Proposed a framework that achieved zero-shot instance-level spatial grounding on both foreground subjects and background objects in the text-to-image customization task, enabling the customization of multiple subjects.
- Our work is the first work to achieve a joint grounding on both subject-driven foreground generation and text-driven background generation.
- Results show the effectiveness of our model in text-image alignment, identity preservation, and layout alignment.

- Text to 360-Degree Scene Generation

*Research Project during internship at OPPO US Research Center*

2024.05 – 2024.11

- Proposed a holistic text to 360-degree scene generation pipeline, which achieved consistent text-to-360-degree scene generation with customized trajectory-guided scene extension.
- Introduced semantically guided novel view synthesis into the refinement of 3D-GS optimization, reducing artifacts and improving geometric consistency.

- Mixed-View Panorama Synthesis Using Geospatially-Guided Diffusion

2023.05 – 2023.11



- Introduced the task of mixed-view panorama synthesis, where the goal is to synthesize a novel panorama given a small set of input panoramas and a satellite image of the area.
- Introduced an approach that utilizes diffusion-based modeling and an attention-based architecture for extracting information from all available input imagery.

- Open-World Generation of Stereo Images and Unsupervised Matching

2024.09 – 2025.03



- Proposed GenStereo, a novel diffusion-based framework for open-world stereo image generation with applications in unsupervised stereo matching.

- Co-training for Stereo and Flow with Unsupervised Domain Adaptation

2023.01 – 2023.05



- Built an end-to-end joint learning framework to combine unsupervised domain translation with optical flow estimation and stereo matching in the absence of real ground truth optical flow and disparity.
- Applied novel constraints on the cycle domain translation process to achieve cross-domain translation with global and local consistency.
- Employed task-specific multi-scale feature warping loss and iterative feature warping loss during the training phase to regulate the training process in both spatial and temporal dimensions.

- Vision-Language Pseudo-Labels for Single-Positive Multi-Label Learning

2022.11 – 2023.05



- Proposed a novel approach called Vision-Language Pseudo-Labeling (VLPL), which uses a vision-language model to suggest strong positive and negative pseudo-labels, and outperforms the current SOTA methods by 5.5% on Pascal VOC, 18.4% on MS-COCO, 15.2% on NUS-WIDE, and 8.4% on CUB-Birds.

- Mobile AI 2021 Real-Time Camera Scene Detection Challenge

2021.01 – 2021.03



*Mobile AI Workshop @ CVPR 2021*

- Used two-stage fine-tuning method to improve the accuracy and the model pruning method to improve the model’s efficiency.
- Used the float32-to-int8 quantization and model pruning methods to optimize our model.

## SERVICES

- **Reviewer:** CVPR(2025), ECCV(2024), NeurIPS(2024,2025), ICML(2025), ICLR(2025), ICCV(2025)
- **Teaching Services (WashU):** CSE 559A Computer Vision (Teaching Assistant/Grader)

## TECHNICAL SKILLS

**Programming:** Python, C/C++, Java, Matlab

**Deep Learning Frameworks:** Pytorch, Tensorflow

**Research Frameworks:** Diffusion models, Transformer, GAN, 3DGS, NeRF, CNN, CLIP, VLMs

**Languages:** English, Chinese