

# Beijia Lu

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## Education

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<b>Carnegie Mellon University</b> Master of Science in Computer Vision	2024-2026 Pittsburgh, PA
<b>City University of Hong Kong</b> Bachelor of Science in Mathematics	2020-2024 Hong Kong

## Industry Experience

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<b>Research Intern @ Shanghai AI Laboratory</b> <i>Supervised by Prof. Ziwei Liu</i>	May 2024-Aug 2024 Shanghai, China
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*Project: 3D-Aware Human Image Animation*

- Developed a methodology for human image animation using a 3D human parametric model within a latent diffusion framework, enhancing shape alignment and motion guidance in generative techniques.
- Integrated depth images, normal maps, and semantic maps from SMPL sequences with skeleton-based motion guidance to achieve high-quality human animations.

## Research Experience

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<b>Research Assistant @ Carnegie Mellon University</b> <i>Supervised by Prof. Jun-Yan Zhu</i>	May 2024-Present Pittsburgh, PA
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*Project: Co-Speech Gesture Video Generation*

- Developed an end-to-end audio-driven co-speech video generation pipeline using 3D human mesh-based representations to synthesize human speech videos.
- Implemented a mesh texture-map optimization step and a new conditional GAN-based network, resulting in photorealistic gesture videos with realistic hands.

<b>Summer Intern @ Johns Hopkins University</b> <i>Supervised by Prof. Alan Yuille</i>	Mar 2023-Nov 2023 Baltimore, MD
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*Project: Diffusion Models for Generating Images with 3D Annotations*

- Introduced 3D-DST to incorporate 3D geometry control into diffusion models using ControlNet, enabling generation of realistic images with adjustable 3D structures and automatic ground-truth 3D annotations.
- Achieved improved robustness and reduced biases in vision tasks by leveraging diverse prompt generation and explicit 3D control.

<b>Undergraduate Intern @ National University of Singapore</b> <i>Supervised by Prof. Mike Z. Shou</i>	Sep 2022-Oct 2023 Singapore
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*Project: Neural Radiance Fields (NeRF) for Colonoscopy Reconstruction*

- Proposed ColonNeRF, a novel neural radiance field-based framework, revolutionizing long-sequence colonoscopy reconstruction crucial for diagnosing colorectal cancer.
- Demonstrated the state-of-the-art performance of our algorithm across multiple datasets and evaluation metrics, notably enhancing the clarity of textures and accuracy of geometric details in the reconstructed images.

## Publications

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- [1] **B. Lu\***, Y. Shi\*, J. Liu, M. Li, M. Zheng, "ColonNeRF: Neural Radiance Fields for Colonoscopy Reconstruction", submitted to **IEEE JBHI**. [\[paper\]](#)
- [2] P. Wang, X. Hui, J. Wu, Z. Yang, K. Ong, **B. Lu**, D. Huang, E. Ling, W. Chen, K. Ma, M. Hur, J. Liu et al., "SemTrack: A Large-scale Dataset for Semantic Tracking in the Wild", **ECCV 2024**. [\[paper\]](#)
- [3] W. Ma, Q. Liu, J. Wang, X. Yuan, A. Wang, G. Zhang, **B. Lu**, R. Duan, Y. Qi, Y. Liu, A. Yuille et al., "Generating Images with 3D Annotations Using Diffusion Models", **ICLR 2024 (Spotlight)**. [\[paper\]](#)

## Skills

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**Programming:** Python, Java, SQL, Linux, MATLAB, R, Bash

**Deep Learning/Machine Learning:** PyTorch, Open3D, Blender, Scikit-Learn, OpenCV