Di Liu

(443) 941-5971
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My Google Scholar Page
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Research Interests

My current research interests lie primarily in (1) Computer Vision and Computer Graphics (*e.g.*, Diffusion Models, Gaussian Splatting); (2) Large-scale multi-modality pretraining and foundation models for visual understanding (*e.g.*, vision-language models, multimodal models, world models).

Education

Rutgers University, *Ph.D. in Computer Science* 09/2021 — Present

Advisor: Dimitris N. Metaxas (Board of Governors and Distinguished Professor)

The Johns Hopkins University, *Research Assistant in Electrical and Computer Engineering* 01/2020 — 08/2021

Advisor: Jerry L. Prince

Beijing Institute of Technology, *M.S. in Information and Communication Engineering* 09/2018 — 06/2021

Advisor: Ran Tao

Experience

Research Assistant, Rutgers University **09/2021 — Present**

Advisor: Dimitris N. Metaxas *Piscataway, NJ*

- Large Sign Language Models for 3D American Sign Language Translation.[Siggraph Aia 2025, under review]
- Text-to-Character Blendshape Generation with Video Diffusion Models. [ICCV'25, under review]
- Instant Generation of Animatable Dual-stylized Avatars. [ICCV'25, under review]
- Layout-Agnostic Scene Text Image Synthesis with Diffusion Models. [CVPR'24]
- 3D Shape Reconstruction and Part Discovery from a Single Image. [ICCV'23, NeurIPS'23]
- Fundamental Research of Diffusion Models in Generative Modeling. [CVPR'25, ICLR'25]
- Inference-time Large Language Models (LLMs) and Multi-modality Large Language Models (MLLMs). [ICML'25, ICLR'25]
- Multi-modality Foundation Models in Medical Imaging. [CVPR'25, CVPR'24]

Research Scientist Intern, Codec Avatars Team, Reality Labs Research, Meta **05/2024 — 11/2024**

Host: Chen Cao *Pittsburgh, PA*

- Universal Layered (Compositional Head and hair) Codec Avatar Reconstruction from Videos. [CVPR'25]

Research Scientist Intern, Cognition, Cloud & AI, Microsoft **01/2024 — 05/2024**

Host: Dongdong Chen *Redmond, WA*

- Large-scale Multi-modality Pretraining and Vision-language Models for Visual Understanding.

Research Scientist Intern, Media Analytics, NEC Labs America **05/2023 — 08/2023**

Host: Bingbing Zhuang and Manmohan Chandraker *San Jose, CA*

- Instantaneous Perception of Moving Objects in 3D. [CVPR'24]

Research Assistant, The Johns Hopkins University **01/2020 — 08/2021**

Advisor: Jerry L. Prince *Baltimore, MD*

- Label Super Resolution for 3D Magnetic Resonance Images. [SPIE'21]

Selected Publications

[1] **Di Liu***, Eric Ming Chen*, Sizhuo Ma, Michael Vasilkovsky, Bing Zhou, Qiang Gao, Wenzhou Wang, Jiahao Luo, Dimitris N. Metaxas, Vincent Sitzmann, Jian Wang. "Snapmoji: Instant Generation of Animatable Dual-Stylized Avatars." In: *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, 2025, under review.

[2] **Di Liu**, Teng Deng, Giljoo Nam, Yu Rong, Stanislav Pidhorskyi, Junxuan Li, Jason Saragih, Dimitris N. Metaxas, Chen Cao. "LUCAS: Layered Universal Codec Avatars." In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2025.*

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[3] Zhuowei Li, Haizhou Shi, Yunhe Gao, **Di Liu**, Zhenting Wang, Yuxiao Chen, Ting Liu, Long Zhao, Hao Wang, Dimitris N. Metaxas. "The Hidden Life of Tokens: Reducing Hallucination of Large Vision-Language Models via Visual Information Steering." In: *Proceedings of the International Conference on Machine Learning (ICML), 2025.*

[4] Xiaoxiao He, Ligong Han, Quan Dao, Song Wen, Minhao Bai, **Di Liu**, Han Zhang, Martin Renqiang Min, Felix Juefei-Xu, Chaowei Tan, Bo Liu, Kang Li, Hongdong Li, Junzhou Huang, Faez Ahmed, Akash Srivastava, Dimitris N. Metaxas. "Dice: Discrete inversion enabling controllable editing for multinomial diffusion and masked generative models." In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2025.*

[5] Yunhe Gao, **Di Liu**, Zhuowei Li, Yunsheng Li, Dongdong Chen, Mu Zhou, Dimitris N. Metaxas. "Show and Segment: Universal Medical Image Segmentation via In-Context Learning." In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2025.*

[6] Quan Dao, Khanh Doan, **Di Liu**, Trung Le, Dimitris N. Metaxas. "Improved Training Technique for Latent Consistency Models." In: *Proceedings of the Thirteenth International Conference on Learning Representations (ICLR), 2025.*

[7] Zhuowei Li, Zihao Xu, Ligong Han, Yunhe Gao, Song Wen, **Di Liu**, Hao Wang, Dimitris N. Metaxas. "Implicit In-context Learning." In: *Proceedings of the Thirteenth International Conference on Learning Representations (ICLR), 2025.*

[8] **Di Liu**, Bingbing Zhuang, Dimitris N. Metaxas, Manmohan Chandraker. "Instantaneous Perception of Moving Objects in 3D." In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

[9] Yunhe Gao, Zhuowei Li, **Di Liu**, Mu Zhou, Shaoting Zhang, Dimitris N. Metaxas. "Training Like a Medical Resident: Universal Medical Image Segmentation via Context Prior Learning." In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

[10] Qilong Zhangli, Jindong Jiang, **Di Liu**, Licheng Yu, Xiaoliang Dai, Ankit Ramchandani, Guan Pang, Dimitris N. Metaxas, Praveen Krishnan. "Layout-Agnostic Scene Text Image Synthesis with Diffusion Models." In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

[11] Song Wen, Hao Wang, **Di Liu**, Qilong Zhangli, Dimitris N. Metaxas. "Second-Order Graph ODEs for Multi-Agent Trajectory Forecasting." In: *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2024.

[12] **Di Liu**, Qilong Zhangli, Yunhe Gao, Dimitris N. Metaxas. "LEPARD: Learning Explicit Part Discovery for 3D Articulated Shape Reconstruction." In: *Proceedings of the Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2023.

[13] **Di Liu**, Xiang Yu, Meng Ye, Qilong Zhangli, Zhuowei Li, Zhixing Zhang, Dimitris N. Metaxas. "DeFormer: Integrating Transformers with Deformable Models for Improved Shape Abstractions." In: *Proceedings of the IEEE / CVF International Conference on Computer Vision (ICCV)*, 2023.

[14] **Di Liu**, Yunhe Gao, Qilong Zhangli, Ligong Han, Xiaoxiao He, Zhaoyang Xia, Song Wen, Qi Chang, Zhennan Yan, Mu Zhou, Dimitris N. Metaxas. "Transfusion: Multi-view Divergent Fusion for Medical Image Segmentation with Transformers." In: *Proceedings of the International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI)*, pp. 485-495. Springer, Cham, 2022. [Student Travel Award]

Skills

Programming Languages	Python, C/C++, CUDA, Matlab, HTML/CSS
Frameworks	PyTorch, TensorFlow, OpenCV
Tools and Platforms	Linux/Unix/Mac OSX, MySQL, Git, LaTeX, AWS, Azure

Academic Services

Conference Reviewer:

European Conference on Computer Vision (ECCV), 2022, 2024.

IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022-2025.

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IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2024.
Advances in Neural Information Processing Systems (NeurIPS), 2023-2025.
IEEE/CVF International Conference on Computer Vision (ICCV), 2023, 2025.
International Conference on 3D Vision (3DV), 2022-2024.

Journal Reviewer:
IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)

Honors & Activities

MICCAI Student Travel Award, 2022.
The National Scholarship (highest scholarship given by Chinese government), 2020.