Di Liu

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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.[NeurIPS 2025, under review]
- Text-to-Character Blendshape Generation with Video Diffusion Models. [ICCV'25, under review]
- Instant Generation of Animatable Dual-stylized Avatars. [Siggraph Asia'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 18th ACM SIGGRAPH Conference and Exhibition on Computer Graphics and Interactive Techniques in Asia (Siggraph Aisa), 2025, under review.*

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[2] Jiahao Luo, Chaoyang Wang, Michael Vasilkovsky, Vladislav Shakhrai, **Di Liu**, Peiye Zhuang, Sergey Tulyakov, Peter Wonka, Hsin-Ying Lee, James Davis, Jian Wang. "T2Bs: Text-to-Character Blendshapes via Video Generation." In: *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV), 2025, under review.*

[3] **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.*

[4] 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.*

[5] 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.*

[6] 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.*

[7] 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.*

[8] 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.*

[9] **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.*

[10] 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.*

[11] 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.*

[12] 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.*

[13] **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.*

[14] **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.*

[15] **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

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ACADEMIC SERVICES

Conference Reviewer:

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

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

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.