Zhe Liu

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Personal Summary

I am currently a postdoctoral researcher in the Department of Computer Science at The University of Hong Kong, under the supervision of Prof. Hengshuang Zhao. Previously, I obtained my Ph.D. from Huazhong University of Science and Technology (HUST), where I was advised by Prof. Xiang Bai. In the field of autonomous driving, I have published over 15 top-tier journal and conference papers, including TPAMI, TIP, ECCV, NeurIPS, ICCV, AAAI, TITS, and ICRA. My Google Scholar citations exceed 1,600, with an h-index of 11 (June 2025). Currently, my research focuses on: (1) Unified representation learning across multiple modalities to develop large-scale 3D foundation models; (2) Integrating 3D foundation models, large language models, and deep reinforcement learning to construct a reliable 4D world model; and (3) Exploring advanced research in Embodied AI (*e.g.*, VLA/VLN) and Physical AI. In addition, I serve as a reviewer for several prestigious journals and conferences, including TPAMI, TIP, TITS, CVPR, ICCV, ECCV, NeurIPS, ICLR, AAAI, IJCAI and ICRA.

Education

The University of Hong Kong (HKU) — **Hong Kong, China**
Postdoctoral Researcher in Department of Computer Science — *2025–Now*
Supervisor: Prof. Hengshuang Zhao

Huazhong University of Science and Technology (HUST) — **Wuhan, China**
Ph.D. in Electronic Information and Communications — *2020–2025*
Supervisor: Prof. Xiang Bai

Publications

Google Scholar: 1600+

[1] **Zhe Liu**, Xin Zhao, Tengteng Huang, Ruolan Hu, Yu Zhou, Xiang Bai. TANet: Robust 3D Object Detection from Point Clouds with Triple Attention, Association for the Advancement of Artificial Intelligence Conference (AAAI) 2020. (Oral, acceptance rate <5%, Google Citation >430)

[2] Tengteng Huang*, **Zhe Liu***, Xiwu Chen, Xiang Bai. EPNet: Enhancing Point Features with Image Semantics for 3D Object Detection, European Conference on Computer Vision (ECCV) 2020. (*: Equal contribution, Google Citation >540)

[3] **Zhe Liu**, Tengteng Huang, Bingling Li, Xiwu Chen, Xi Wang, Xiang Bai. EPNet++: Cascade Bi-directional Fusion for Multi-Modal 3D Object Detection, IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 2022 (IF=24.314)

[4] **Zhe Liu**, Xiaoqing Ye, Xiao Tan, Errui Ding, Xiang Bai. StereoDistill: Pick the Cream from LiDAR for Distilling Stereo-based 3D Object Detection, Association for the Advancement of Artificial Intelligence Conference (AAAI) 2023

[5] Xin Zhao, **Zhe Liu**$^{+}$, Ruolan Hu, Kaiqi Huang. 3D Object Detection Using Scale Invariant and Feature Reweighting Networks, Association for the Advancement of Artificial Intelligence Conference (AAAI) 2019. ($^{+}$: Corresponding Author, Spotlight)

[6] **Zhe Liu**, Xiaoqing Ye, Zhikang Zou, Xinwei He, Xiao Tan, Errui Ding, Jingdong Wang, Xiang Bai. Multi-Modal 3D Object Detection by Box Matching, IEEE Transactions on Intelligent Transportation Systems (T-ITS) 2024

[7] **Zhe Liu**, Jinghua Hou, Xiaoqing Ye, Tong Wang, Jingdong Wang, Xiang Bai. SEED: A Simple and

Effective 3D DETR in Point Clouds, European Conference on Computer Vision (ECCV) 2024

[8] **Zhe Liu**, Jinghua Hou*, Xinyu Wang, Xiaoqing Ye, Jingdong Wang, Hengshuang Zhao, Xiang Bai. LION: Linear Group RNN for 3D Object Detection in Point Clouds, Conference on Neural Information Processing Systems (NeurIPS) 2024

[9] Jinghua Hou*, **Zhe Liu***, et al. Query-based Temporal Fusion with Explicit Motion for 3D Object Detection, Conference on Neural Information Processing Systems (NeurIPS) 2023. (*: Equal contribution)

[10] Jingyu Li*, **Zhe Liu***, Jinghua Hou, Dingkang Liang. DDS3D: Dense Pseudo-labels with Dynamic Threshold for Semi-supervised 3D Object Detection, IEEE International Conference on Robotics and Automation (ICRA) 2023. (*: Equal contribution)

[11] Silin Cheng, Xiwu Chen, Xinwei He, **Zhe Liu**, Xiang Bai. PRA-Net: Point Relation-Aware Network for 3D Point Cloud Analysis, IEEE Transactions on Image Processing (TIP) 2021

[12] Jianhong Han, Zhaoyi Wan, **Zhe Liu**, Jie Feng, Bingfeng Zhou. SparseDet: Towards End-to-End 3D Object Detection, International Conference on Computer Vision Theory and Applications (VISAPP) 2022. (Best Student Paper Award)

[13] Kaixin Xiong, Dingyuan Zhang, Dingkang Liang, **Zhe Liu**, Hongcheng Yang, Wondimu Dikubab, Cheng Jianwei, Xiang Bai. You Only Look Bottom-Up for Monocular 3D Object Detection, IEEE Robotics and Automation Letters (RAL) 2023

[14] Dingyuan Zhang, Dingkang Liang, Zhikang Zou, Jingyu Li, Xiaoqing Ye, **Zhe Liu**, Xiao Tan, Xiang Bai. A Simple Vision Transformer for Weakly Semi-supervised 3D Object Detection, International Conference on Computer Vision (ICCV) 2023

[15] Dingyuan Zhang, Dingkang Liang, Hongcheng Yang, Zhikang Zou, Xiaoqing Ye, **Zhe Liu**, Xiang Bai. SAM3D: Zero-Shot 3D Object Detection via Segment Anything Model, Science China Information Sciences (SCIS) 2024

[16] Xin Zhou, Jinghua Hou, Tingting Yao, Dingkang Liang, **Zhe Liu**, Zhikang Zou, Xiaoqing Ye, Jianwei Cheng, Xiang Bai. Diffusion-based 3D Object Detection with Random Boxes, Chinese Conference on Pattern Recognition and Computer Vision (PRCV) 2023

[17] Hongcheng Yang, Dingkang Liang, Dingyuan Zhang, Xingyu Jiang, **Zhe Liu**, Zhikang Zou, Yingying Zhu. AVS-Net: Point Sampling with Adaptive Voxel Size for 3D Point Cloud Analysis, arXiv e-prints, arXiv:2402.17521, 2024

[18] Hongcheng Yang, Dingkang Liang, **Zhe Liu**, Jingyu Li, Zhikang Zou, Xiaoqing Ye, Xiang Bai. An Empirical Study of Ground Segmentation for 3-D Object Detection, IEEE Transactions on Intelligent Transportation Systems (T-ITS), 2025

Patents

US11488308B2 (Nov. 1 , 2022), "Three-dimensional object detection method and system based on weighted channel features of point cloud".

CN111046781B (May 27, 2022), "A robust three-dimensional object detection method based on ternary attention mechanism".

Awards & Honors

2021: National Silver Award, "Internet+" Contest

2020: "NavInfo" Scholarship Winner (top 3 of 300+)

2019: Master National Scholarship Winner, HUST

2016: National First Prize, National Undergraduate Mathematical Contest in Modeling

2016: International First Prize, Mathematical Contest in Modeling

2016: Second Prize, Hubei Province, National Undergraduate Mathematics Contest

2015: First Prize, Hubei Province, National Undergraduate Mathematical Contest in Modeling

Experience

Huawei Noah's Ark Lab — **Beijing**
Research Intern — *2020-2021*

Baidu Vision Technology Department — **Shanghai**
Research Intern — *2022-2025*

Academic Service

- **Conference Reviewer / Program Committee:**
  - IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
  - IEEE International Conference on Computer Vision (ICCV)
  - European Conference on Computer Vision (ECCV)
  - Neural Information Processing Systems (NeurIPS)
  - International Conference on Learning Representations (ICLR)
  - AAAI Conference on Artificial Intelligence (AAAI)
  - International Joint Conference on Artificial Intelligence (IJCAI)
  - IEEE/RSJ International Conference on Robotics and Automation (ICRA)
  - International Conference on Acoustics, Speech and Signal Processing (ICASSP)
  - ACM Multimedia Asia (ACMMM Asia)
- **Journal Reviewer:**
  - IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
  - IEEE Transactions on Image Processing (TIP)
  - IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
  - IEEE Transactions on Intelligent Transportation Systems (TITS)
  - IEEE Robotics and Automation Letters (RA-L)
  - Science China-Information Sciences (SCIS)
  - IEEE Transactions on Geoscience and Remote Sensing (TGRS)
- **Invited Talks:**
  - Invited by "Jiqizhixin" to share the TANet paper (2020)
  - Invited by "Midea Research Institute" for "3D Object Detection in Point Cloud" (2020)
  - Invited by "3dcver" to share the LION paper (2024)
  - Invited by "Shuzihuanyu" to share LION and SEED papers (2024)
  - "The Heart of Autonomous Driving" – Taught the first course on "Multimodal Fusion 3D Object Detection" in China (>8 hours, 2023)
- **Volunteer:**
  - Main volunteer, "China-Africa Text Recognition and Natural Language Processing Innovation Forum" (2023)