

# Ziqi Pang

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“Enhance the Knowledge in *Generative Foundation Models* for *Perception and Agents in Long Videos*”

## EDUCATION

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<b>University of Illinois Urbana-Champaign (UIUC)</b> Doctor of Philosophy in Computer Science	<i>September 2021 - Current</i> Advisor: Prof. Yu-Xiong Wang
<b>University of Illinois Urbana-Champaign (UIUC)</b> Master of Science in Computer Science	<i>September 2021 - May 2024</i> Advisor: Prof. Yu-Xiong Wang
<b>Peking University (PKU)</b> Bachelor of Science in Computer Science, Cum Laude	<i>September 2016 - June 2020</i> GPA: 3.74/4.00, Top 15%
<b>Carnegie Mellon University (CMU)</b> Summer Research Assistant	<i>May 2019 - September 2019</i> Advisor: Prof. Martial Hebert

## RESEARCH, WORKING, AND INTERNSHIP EXPERIENCE

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**University of Illinois Urbana-Champaign, Ph.D. Student** *September 2021 - Current*  
◦ Video Understanding and Embodied Perception.

- (1) Language-instructed video segmentation with unified global-local reasoning (**GLUS**, in submission).
- (2) Improved memory bank for long and challenging video segmentation (**RMem** - CVPR 2024).
- (3) First long-term temporal fusion and data flywheel for mapping (**MV-Map** - ICCV 2023).
- (4) Continuous motion prediction mimicking real-world traffic (**Streaming Forecasting** - IROS 2023).
- (5) End-to-end vision-only 3D MOT, 10% errors than previous ones (**PF-Track** - CVPR 2023).

◦ Generative Models for Multi-modal Understanding.

- (1) Causal GPT transformers can model image tokens in random orders (**RandAR**, in submission).
- (2) Aligning generative diffusion denoising for discriminative visual perception (ICLR 2025).
- (3) Diffusion-based image generation from graph connections (**InstructG2I** - NeurIPS 2024).
- (4) Transformers from LLMs can encode varied visual modalities (**LM4VE** - ICLR 2024 Spotlight).

**NVIDIA, Research Intern** *May 2024 - August 2024*  
◦ Online HD Map Prediction. For the autonomous driving group at NVIDIA, we conducted research on building scalable generative pre-training for online high-definition (HD) map predictions..

**Toyota Research Institute, Research Intern** *May 2022 - December 2022*  
◦ 3D tracking and motion forecasting from multiple cameras. End-to-end multi-object tracking (MOT) and motion prediction decrease tracking errors (ID-Switches) by more than 90% on nuScenes compared to previous state-of-the-arts (**PF-Track** - CVPR 2023).

**TuSimple, AI Residency for Perception in Self-driving** *June 2020 - August 2021*  
◦ LiDAR-based 3D perception for autonomous driving. Public projects:  

- (1) Sparsity-inspired outdoor 3D detection, first transformer-based 3D detector, widely followed baseline since then (**SST** - CVPR 2022).
- (2) A widely used and robust 3D multi-object tracking framework (**SimpleTrack** - ECCVW 2022).
- (3) Data flywheel and object auto-labeling from single-object tracking (**LiDAR-SOT** - IROS 2021).

**RandAR: Decoder-only Autoregressive Visual Generation in Random Orders** [[RandAR](#)]  
*Ziqi Pang\**, Tianyuan Zhang, Fujun Luan, Yunze Man, Hao Tan, Kai Zhang, William T. Freeman,  
Yu-Xiong Wang

**In Submission**

**GLUS: Global-Local Reasoning Unified into A Single Large Language Model for Video Segmentation** [[GLUS](#)]

*Lang Lin\**, Xueyang Yu\*, *Ziqi Pang\**, Yu-Xiong Wang

**In Submission**

**Aligning Generative Denoising with Discriminative Objectives Unleashes Diffusion for Visual Perception**

*Ziqi Pang\**, Xin Xu\*, Yu-Xiong Wang

**ICLR 2025**

**InstructG2I: Synthesizing Images from Multimodal Attributed Graphs** [[InstructG2I](#)]

*Bowen Jin*, *Ziqi Pang*, Bingjun Guo, Yu-Xiong Wang, Jiaxuan You, Jiawei Han

**NeurIPS 2024**

**RMem: Restricted Memory Banks Improve Video Object Segmentation** [[RMem](#)]

*Junbao Zhou\**, *Ziqi Pang\**, Yu-Xiong Wang

**CVPR 2024**

**Frozen Transformers in Language Models Are Effective Visual Encoder Layers** [[LM4VE](#)]

*Ziqi Pang*, Ziyang Xie\*, Yunze Man\*, Yu-Xiong Wang

**ICLR 2024 (Spotlight)**

**MV-Map: Offboard HD-Map Generation with Multi-view Consistency** [[MV-Map](#)]

*Ziyang Xie\**, *Ziqi Pang\**, Yu-Xiong Wang

**ICCV 2023**

**Streaming Motion Forecasting for Autonomous Driving** [[Streaming Forecasting](#)]

*Ziqi Pang*, Deva Ramanan, Mengtian Li, Yu-Xiong Wang

**IROS 2023**

**Standing Between Past and Future: Spatio-Temporal Modeling for Multi-Camera 3D Multi-Object Tracking** [[PF-Track](#)]

*Ziqi Pang*, Jie Li, Pavel Tokmakov, Dian Chen, Sergey Zagoruyko, Yu-Xiong Wang

**CVPR 2023**

**Embracing Single Stride 3D Object Detector with Sparse Transformer** [[SST](#)]

*Lue Fan*, *Ziqi Pang*, Tianyuan Zhang, Yu-Xiong Wang, Hang Zhao, Feng Wang, Naiyan Wang, Zhaoxiang Zhang

**CVPR 2022**

**SimpleTrack: Understanding and Rethinking 3D Multi-object Tracking** [[SimpleTrack](#)]

*Ziqi Pang*, Zhichao Li, Naiyan Wang

**ECCV Workshop 2022, Patented 2023**

**Model-free Vehicle Tracking and State Estimation in Point Cloud Sequences** [[LiDAR-SOT](#)]

*Ziqi Pang*, Zhichao Li, Naiyan Wang

**IROS 2021**

## PREPRINTS

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**Unlocking the Full Potential of Small Data with Diverse Supervision** [SmallData]

*Ziqi Pang\**, *Zhiyuan Hu\**, *Pavel Tokmakov*, *Yu-Xiong Wang*, *Martial Hebert*

Arxiv Preprint 2021

**Immortal Tracker: Tracklet Never Dies** [ImmortalTracker]

*Qitai Wang*, *Yuntao Chen*, *Ziqi Pang*, *Naiyan Wang*, *Zhaoxiang Zhang*

Arxiv Preprint 2021

## PATENTS

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**Multiple target tracking method and apparatus, calculating device and storage medium**

*Ziqi Pang*, *Zhichao Li*, *Naiyan Wang*

US Patent App. 17/816,239, 2023

## SERVICES

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**Teaching Assistants** for **CS 446 (Machine Learning)** and **CS 445 (Computational Photography)** at University of Illinois Urbana-Champaign (UIUC), and **ICS (Introduction to Computer System)** at Peking University (PKU).

**Reviewer** for CVPR, ICCV, ECCV, NeurIPS, ICLR, ICML, RA-L, ICRA, IROS.

## AWARDS AND SCHOLARSHIPS

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**Outstanding Graduate** at Peking University

*June 2020*

**Peking University Scholarship** at Peking University (Top 10%)

*September 2018*

**Kwung-hua Scholarship** at Peking University (Top 5%)

*September 2017*