Qianxun (Cecilia) Xu

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EDUCATION

Duke Kunshan University (DKU) & Duke University Dual Degree 2022 - 2026

- B.S. in Applied Math and Computer Science; Computer Science Track (GPA: 3.916/4.0)
- Courses: Introduction to Machine Learning, Design and Analysis of Algorithms, Stochastic Processes, Artificial Intelligence.
- Scholarships: College Entrance Scholarship with 50% Tuition

ACADEMIC PAPERS

Xu, Q., Li, Z. (2025, May). Partial Physics Informed Diffusion Model for Ocean Chlorophyll Reconstruction. Accepted by NeurIPS 2025 main track (Poster).

Xu, Q., Boukerche, A., Sun, P. (2025, Aug). FENSe: Feedback-Enabled Neighbor Selection for Spatial Aware Collaborative Perception. Submitted to IEEE ICPADS 2025. Under review.

RESEARCH EXPERIENCE

AIGC Summer Research *at Westlake University*

Lead Researcher May 2025 - Present

Supervisor: prof. Chi Zhang, Westlake University Hangzhou, China

- (Project in progress, targeting CVPR2026) **Temporal-aware, training-free multi-event video generation**: Addresses time-agnostic cross attention (actions words affect every frame) via (i) temporal-aware query edits to boost or suppress event-specific motion, and (ii) a novel zig-zag guidance schedule to reduce identity drift and event boundary flicker.
- (Prototype1) **Region-constrained 2D personalization & multi-concept learning**: Added subject mask guidance to LoRA-style fine tuning (SVDiff) using refined attention masks or YOLO+SAM masks to prevent background leakage; enabled simultaneous multi-concept extraction to reduce concept blending. (GitHub link)
- (Prototype2) **Large to small object replacement video editing**: Extended inversion free video editing pipeline FlowDirector with a late step fixed noise schedule. Smoothed editing trajectories and reduced flicker in newly revealed background regions during editing in large-to-small edits. (GitHub link)

Partial Physics Informed Diffusion Model (PPIDM) *for Summer Research Scholar Program at DKU*

Lead Researcher May 2024 - May 2025

Supervisor: prof. Zuchuan Li, DKU Kunshan, China

- Built PPIDM to reconstruct real world states from sparse data under uncertain physics. Integrated incomplete physics knowledge into the diffusion process via a novel physics residual difference loss, selectively encoding measurable physics while avoiding over-constraining unknown processes.
- Designed differentiable physics operators and hyperparameter tuning guide for different dominance states of known physics.
- Benchmarked PPIDM robustness on long-range infilling and prediction of Southern Ocean chlorophyll using physics-aware metrics; achieved 34% lower RMSE than data-only diffusion (0.27 vs 0.41) with improved stability, outperforming baselines that misapply incomplete physics by 49% and partial-physics posterior *sampling* baselines by 31%.

Autonomous Driving Research *for Undergraduate Signature Work at DKU*

Lead Researcher Jan 2025 - Present

Supervisor: prof. Peng Sun, DKU Kunshan, China

- **Feedback-Enabled Neighbor Selection (FENSe) for Collaborative Perception:** Addressed redundant sharing among neighbor vehicles via a plug-and-play module that converts single-vehicle outputs into compact feedback signals, performs dynamic clustering and selection, and transmit only the most informative features. Performed thorough ablations and evaluations, achieving a stronger accuracy-efficiency trade-off (+4% accuracy at equal bandwidth) with lower ego side compute.
- (In progress) **End-to-End Diffusion Driving World-Model** (unifying Perception & Planning): Designs a latent world model that samples rule-consistent, uncertainty-aware future trajectories from raw sensor data via a diffusion framework.

PROJECT EXPERIENCE

TransGCN For Muscle Activation Prediction from Joint Angles During Motion Mar - May 2025

Individual Course Project Kunshan, China

- Adapted a spatio-temporal Transformer + kinematic graph GCN architecture to predict per frame muscle activations from joint angles sequences. Integrated demographic embeddings (gender/weight/height) for personalized estimates.
- Performed systematic ablations; achieved >11% improvement over various LSTM and vanilla Transformer baselines.
- Delivered 3 milestone reports, an 8-page final report, and a 90-minute poster presentation. (GitHub link)

CAMPUS EXPERIENCE

Computer Science 101 Course at DKU Oct - Dec 2022

Teaching Assistant Kunshan, China

- Led weekly lab sessions and office hours; graded quizzes and assignments; analyzed error trends and common confusions.
- Utilized data-driven insights to recommend curriculum adjustments, increasing student engagement and academic achievement.

ADDITIONAL INFORMATION

Languages: English (GRE:324/340+4.5/6, July2024; TOEFL:114/120, Aug2021), German (conversational), Mandarin (native)

Skills: Python, Java, C, Latex, Excel, Adobe PS