# Xinghao Chen

Email: cxh42@uw.edu | Personal Website: cxh42.github.io | GitHub: cxh42 | LinkedIn: cxh42

## Education

**University of Washington**, Seattle, WA                                               Sep 2024 – Dec 2025
Master of Science in Electrical & Computer Engineering

- **GPA:** 3.9/4.0
- **Key Coursework:** Computer Vision; Large Language Models; Virtual Reality Technologies; Deep Learning

**Henan University**, Kaifeng, China                                                    Sep 2020 – Jun 2024
Bachelor of Engineering in Automation

- **GPA:** 3.5/4.0

## Publications & Preprints

**AirV2X-Sim:**                                                                         Under Review
**Air-Ground Co-simulator for Agentic Vehicle-to-Everything Collaboration**

- *Co-author, Submitted to IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026.*
- **Key contributions:** Develops a unified air–ground V2X co-simulator that couples CARLA and AirSim, supports heterogeneous agents (CAVs, RSUs, UAVs), enables agentic language-based collaboration, and models realistic V2X communication for closed-loop evaluation.
- **Technical highlights:** Introduces a neural digital-twin pipeline based on 3D Gaussian Splatting (3DGS) to reconstruct photorealistic driving scenes from real V2X datasets and integrate the learned neural fields back into the simulator for perception and planning benchmarks.
- 📄 **[PDF Manuscript]**

**AirV2X-Perception:**                                                                  Under Review
**Air-Ground Vehicle-to-Everything Collaborative Perception Dataset**

- *Co-author, Submitted to IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026.*
- **Note:** An earlier version is available on arXiv:2506.19283.
- **Key contributions:** Presents a large-scale air–ground collaborative perception dataset with up to 15 agents per scene (vehicles, RSUs, UAVs), multi-modal sensors, and benchmarks for 3D object detection and BEV semantic segmentation across diverse environments (urban/rural, day/night, adverse weather).
- **Technical highlights:** Designs three UAV navigation policies (hover, patrol, escort) within the CARLA+AirSim co-simulation and uses them to study how aerial viewpoints and motion patterns impact downstream collaborative perception performance.
- 📄 **[PDF Manuscript]**

## Research Experience

**Research Assistant** | TACO Group, Texas A&M University                              Jan 2025 – Present

- **AirV2X Neural Digital Twin & Air–Ground Simulation:** Co-developed the AirV2X air–ground co-simulation stack (CARLA+AirSim), implementing a 3D Gaussian Splatting pipeline to build neural digital twins of real driving scenes and integrating them back into the simulator. Designed UAV navigation policies (hover, patrol, escort) and used them to study how aerial viewpoints and motion patterns affect collaborative perception and downstream planning in closed-loop settings.
- **VLM Distillation for 4K Restoration (Current Focus):** Developing an end-to-end restoration agent by distilling the 4K-Agent's explicit multi-step planning into an 8B VLM. Designing a three-stage training pipeline (SFT blueprinting, DPO-style alignment to penalize failure trajectories, and RL with GRPO and composite rewards) to achieve ultra-fast, implicitly planned 4K restoration.
- **Quality Assessment for AIGC Video Super-Resolution (Current Focus):** Investigating evaluation methods for AIGC-based video super-resolution, where the low-resolution input is not a strict ground-truth target and visually plausible hallucinations can be beneficial. Building an evaluation pipeline that emphasizes semantic consistency, structural integrity, and temporal coherence over pixel-wise fidelity (PSNR/SSIM), combining self-supervised visual

encoders (e.g., DINO), optical-flow-based temporal cues, and LMM-based judgments over visualized discrepancies to provide practical metrics and protocols for this emerging class of generative video methods.

**Research Assistant** | Applied Physics Laboratory, University of Washington                      Dec 2024 – Jun 2025

- **CoastalSeg system development:** Led the development of CoastalSeg, an end-to-end image segmentation and analysis system for community-uploaded coastal photos. Trained and tuned a DeepLabV3+ model with an EfficientNet-B6 backbone, and implemented preprocessing, multi-class mask generation, and evaluation, achieving an internal IoU of approximately 0.93 on project-specific splits.
- **Deployment & workflow integration:** Implemented both an interactive browser-based interface and a batch processing pipeline that support large-scale segmentation, perspective alignment to reference views, outlier detection, and CSV reporting. Deployed the models as Hugging Face Spaces and integrated the pipeline into coastal erosion monitoring workflows used by the MyCoast platform.

## Awards & Competitions

**3rd place (out of 38 teams)**, UW LLM 2025 Semantic Retrieval Competition                      Feb 2025

## Technical Skills

**Core Research:** 3D vision & neural rendering (3D Gaussian Splatting, NeRF), autonomous driving perception/planning, image/video restoration, LLM/VLM agents, reinforcement learning (PPO, GRPO).
**Programming & Systems:** Python (PyTorch), C++, CUDA, Linux, shell scripting, Docker, Git.
**Simulation & Platforms:** CARLA, AirSim, Unity, Unreal Engine