Statement of Purpose
Chris Chien

Current reconstruction and generation methods excel in controlled environments but struggle to maintain consistency and physical plausibility in unconstrained, real-world applications. My research objective is to enable robust content creation by accurately modeling the underlying physical mechanisms of the visual world. I aim to build systems that make efficient, high-quality content creation widely available, bringing professional-grade capabilities to independent creators and studios.

My transition into computer vision was driven by a desire to decode the physical world. Before this shift, I took foundational machine learning courses during my master's program. I built my technical foundation in privacy-preserving machine learning, publishing work on adversarial attacks and password extraction from surveillance footage. This research sharpened my understanding of pattern recognition and the intersection of spatial and temporal information. I then applied these foundations to computer vision, deconstructing the literature on 3D and 4D Gaussian Splatting to rapidly begin research within just two months.

I joined Professor Yu-Lun Liu's lab to research scene reconstruction, leading to the publication of Splannequin (WACV 2026). I focused on reconstructing underlying static scenes from “near-static” monocular videos, defined by casual, unintended micro motions. Approaching the problem as a physical process, I analyzed the reconstruction mechanism and observed that the space-time relationship allows for self-supervision. By anchoring intermediate states to observed data with physically grounded pseudo-signals, I constrained the model without external supervision. This approach increased compositional quality by 243.8% with zero rendering overhead. Furthermore, it achieved practical usability by eliminating heavy post-processing and strict filming requirements.

I also investigated the fundamental failure modes of current methods. In my analysis of dynamic scene reconstructions, I found that the allocation of 3D points is often driven by color variations. Understanding this bias motivates the questions I aim to pursue: First, how can we guide diffusion models with geometric cues to ensure structural consistency where explicit methods struggle? Second, can we decouple appearance from geometry? And third, how can we embed physical laws to guarantee temporal consistency in 4D generation?

Following the completion of my PhD, I intend to pursue research roles at industry labs such as Disney Research, Adobe Research, or NVIDIA's simulation teams. I aim to advance the technical foundations of digital content creation.

My commitment to working within constraints extends beyond my technical approach. As a transgender woman in STEM navigating spaces designed for a strict binary world, I have trained myself to question default assumptions in systems and maintain rigorous standards despite external friction. This resilience directly influences my research philosophy: I do not ignore constraints; instead, I find ways to succeed within them.

Committed to inclusivity, I plan to contribute to LGBTQ+ people by establishing mentorship circles that help international LGBTQ+ students navigate their unique cultural and academic intersections.