Cheng Wang

galaxea1111@gmail.com | GitHub | LinkedIn | Personal Website

Education

University of California, San Diego — San Diego, CA
Master of Science, Computer Science — *Sep 2022 — June 2024*

Advisor: Prof. Tzu-mao Li
Cumulative GPA: 4.0/4.0

Zhejiang University — Hangzhou, Zhejiang, China
Bachelor of Engineering, Computer Science and Technology — *Sep 2018 — June 2022*

Chu Kochen Honors College
Advisor: Prof. Rui Wang
Cumulative GPA: 3.9/4.0, GPA in Major: 4.0/4.0

Work Experience

Research Assistant — Oct 2024 — Present
University of California, San Diego — *San Diego, CA*

- Working on a very interesting project using a novel method to achieve robust SDF optimization from point cloud signal.
- Submitted a paper to CVPR 2025.

Research Intern — Sep 2023 — Jan 2024
SuLab, University of California, San Diego — *San Diego, CA*

- Worked on ZeroRF, a novel sparse view 360° reconstruction method based on NeRF (see detail in Publications).
- ZeroRF is published in proceedings of IEEE/CVF Conference on Computer Vision and Pattern Recognition 2024.

Software Engineer Intern — Jun 2023 — Sep 2023
Electronic Arts — *Redwood City, CA*

- Developed an advanced decal rendering pipeline for a customized Unreal Engine 5, incorporating support for multiple material effects and dynamic material properties on attached decals. This enhancement significantly improved visual fidelity and expanded the creative possibilities for environment artists.
- Conducted in-depth research and documentation maintenance for Unreal Engine's Lumen global illumination system. Provided comprehensive technical analysis and up-to-date documentation, enabling the development team to effectively utilize and optimize the system's capabilities in various projects.

Software Engineer Intern — Dec 2021 — Jun 2022
RaysEngine Tech Co. LTD — *Hangzhou, Zhejiang, China*

- Conducted advanced research and development on digital human technology, specializing in skin rendering techniques. Implemented and optimized an improved texture space subsurface scattering algorithm, enhancing the visual fidelity of the company's rendering engine.
- Made significant contributions to the engine's standard deferred pipeline module, focusing on performance optimization and quality improvement. Particularly enhanced the subsurface scattering component, resulting in more accurate rendering of translucent materials.

Publications

Near-Field Lighting Estimation via Ray Regression
Cheng Wang, Tzu-mao Li
Master Thesis

- This paper approaches fast near-field lighting estimation by training a vision transformer to predict point light positions from a single observed image, using over-parameterized representations of point lights as rays corresponding to image patches. The proposed method, trained and evaluated on a custom dataset derived from OpenRooms, outperforms naive

end-to-end models in predicting light positions, achieving deviations of around 0.35 and 0.38 of the scene scale compared to 0.60 for the naive method.

ZeroRF: Zero-shot Sparse View 360° Reconstruction
Ruoxi Shi, Xinyue Wei, **Cheng Wang**, Hao Su
In Proceedings of *IEEE/CVF Conference on Computer Vision and Pattern Recognition 2024*

- ZeroRF is a novel per-scene optimization method that addresses sparse view 360° reconstruction in neural field representations by integrating a tailored Deep Image Prior into a factorized NeRF representation. This approach enables efficient sparse view reconstruction without pretraining or additional regularization, achieving state-of-the-art results on benchmark datasets and extending its significance to 3D content generation and editing applications.

Projects

Implementation of Tensorial Radiance Field (TensoRF)

- Implemented TensoRF based on Chen et al.'s work, in which radiance fields are represented with matrix-vector and vector-vector tensor combinations. This approach achieves higher efficiency than MLP-based NeRF while maintaining comparable quality, without requiring customized CUDA implementations.

Autonomous Vehicle Motion Forecasting

- Used deep learning models to forecast autonomous vehicle motion, predicting the positions of tracked objects three seconds into the future. The dataset includes trajectories from Pittsburgh and Miami, and the models incorporate inputs like positions and velocities over a short time frame. Explored different machine learning models including Linear Regression, LSTM, and Encoder-Decoder with Attention Mechanism. Based on extensive experiments, the LSTM model with positional data performed best, although improvements are suggested for better lane prediction and generalization.

Volumetric Path Tracer

- Implemented a volumetric path tracer module based on the educational physically based renderer "lajolla", which efficiently handles multiple chromatic heterogeneous volumes and accurately simulates absorption and multiple scattering effects through the integration of phase function sampling and next event estimation techniques, resulting in more realistic and physically accurate volumetric renderings.

Real-Time Texture-Space Subsurface Scattering

- Implemented an innovative and efficient method for real-time texture-space subsurface scattering, utilizing convolution of radiance maps and weight kernels in texture space. Optimized performance by pre-calculating weight kernels with Burley's normalized diffusion profile and applying wavelet transformation, resulting in a significant reduction in convolution time complexity.
- Awarded the Outstanding Graduation Thesis of Zhejiang University Undergraduates in 2022.

Cyber Creed

- Developed a 3D third-person shooting game inspired by Assassin's Creed using Unreal Engine 4, showcasing advanced game development techniques and engine proficiency.
- Collaborated in a five-person team, taking primary responsibility for scene and level design, enemy animation and AI behavior design, and special effects design.

Tiled Forward Rendering

- Implemented both tiled forward rendering and tiled deferred rendering pipelines based on research papers, demonstrating a deep understanding of modern real-time rendering techniques.
- Optimized the light culling pass through the implementation of multiple frustum division strategies and efficient light-frustum intersection algorithms.

Skills

- **Programming Languages**: C/C++, Python, JavaScript, HTML/CSS, Bash
- **Technologies**: PyTorc, Git, Docker, Kubernetes, OpenGL, Unreal Engine, Blender, React, Tailwind CSS
- **Interests**: Badminton, Computer Games, Classical Music, Cooking