Ruihong Cen

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EDUCATION

Nankai University, Tianjin, China — Sept.2021 — June.2024
M.Eng in Computer Science, supervised by Prof. Bo Ren.

South China University of Technology, Guangdong, China — Sept.2017 — June.2021
B.Eng in Process Equipment and Control Engineering.

RESEARCH INTERESTS

Computer Graphics, Physically-Based Simulation, Numerical Method

PUBLICATION

Layer-based Simulation for Three-Dimensional Fluid Flow in Spherical Coordinates
Ruihong Cen, Bo Ren.
IEEE Transactions on Visualization and Computer Graphics(TVCG), 2024.

- **Abstract:** In this paper, we propose a practical spherical-coordinate simulator for flow motions in 3D domains. Based on a layer-by-layer structure and a boundary-aware pressure solving scheme, we are able to recover horizontal and vertical flow motions in the presence of arbitrary terrain shapes within a spherical shell of finite thickness. Our proposed method provides flexible artistic control strategies for art design.

NeuSmoke: Efficient Dynamic Smoke Reconstruction and View Synthesis with Neural Transportation Fields
Jiaxiong Qiu, **Ruihong Cen**, Zhong Li, Han Yan, Ming-Ming Cheng, Bo Ren.
Siggraph Asia 2024 (Conference Track)

- **Abstract:** In this work we introduce NeuSmoke, an efficient framework for dynamic smoke reconstruction using neural transportation fields, enabling high-quality density reconstruction and novel-view synthesis from multi-view videos.

RESEARCH EXPERIENCES

Research assistant at Shanghai Qizhi Institute — Sept.2021 — present
Supervisor: Dr. Tao Du

- Working on the topic of fluid-solid strong two-way coupling problem.

Research Trainee at TMCC, Nankai University — Sept.2021 — June.2024
Supervisor: Dr. Bo Ren

- Work on the physically-based simulation under the supervision of Dr. Bo Ren to numerically simulate incompressible fluid flow on the spherical shell domain under the 3-D spherical coordinate. (**Has been published in TVCG**)
- Use fluid simulation techniques to create smoke datasets for smoke reconstruction with the neural network. (**In preparation**)
- Study the hyperelastic solid simulation and the efficient fluid-solid two-way coupling methods.

Research Intern at Lumi, miHoYo — June.2023 — Sept.2023
Supervisor: Xiaosong Chen

- Implement the FrictionalMonolith algorithm (consider sand-solid coupling problem) using HDK toolkit.
- propose an easy-to-implement snow simulation scheme under the basis of FrictionalMonolith.

ACADEMIC SERVICE

Computer Graphics Course — Nankai University, China
Teaching Assistant, in Chinese — 2023.3 - 2023.6
Responsible for answering questions and grading homework.

SKILLS

- **Programming:** C, C++, Python, CUDA.
- **Modeling Tools:** Blender, Solidworks.
- **Digital Art Tools:** Houdini.
- **Language:** Chinese(native), English(fluent).