

DIYANG ZHANG

✉ diyang.zhang_gr@dartmouth.edu 🏠 serev99.github.io 🔗 linkedin.com/in/diyang-zhang 📞 +86 189 9400 0578

Education

Dartmouth College
M.S in Computer Science

Hanover, NH, U.S.
2022 - 2025.3 (Expected)

McGill University
B.S with First-Class Honors in Mathematics and Computer Science

Montreal, QC, Canada
2017 - 2022

University of California, Berkeley
Exchange program with a focus on Computer Science

Berkeley, CA, U.S.
Summer 2016

Publication

Fluid Simulation on Neural Flow Maps

Yitong Deng, Hong-Xing Yu, **Diyang Zhang**, Jiajun Wu, Bo Zhu
ACM Transactions on Graphics (SIGGRAPH Asia 2023) (Best Paper Award)

Research Experience

Research Assistant, Dartmouth College, VCL

Turbulent fluid mechanics and vortex dynamics simulation. Advisor: Prof. Bo Zhu

Hanover, NH, U.S.
Sep. 2022 - June 2024

- Integrated implicit neural representations into state-of-the-art physics-based numerical simulation pipeline to model more complicated fluid phenomena and address more challenging simulation scenarios.
- Developed grid-based algorithms to accurately simulate intricate vortex behaviors using impulse field and Lamb vectors of fluids, achieving high physical accuracy and preserving visual details.
- Investigated the Clebsch representation of complex fluid flow using a hybrid approach with Eulerian grid and vortex particles, aiming to develop a simplified numerical model that maintained a decent level of physical accuracy.

Honors Research Project, McGill University, Math Department

Fourier spectral method for fire and smoke simulation. Advisor: Prof. Jean-Christophe Nave

Montreal, QC, Canada
Fall 2021

- Implemented numerical method for fire and flame simulation using Fourier spectral approximations of the Navier-Stokes equations, resulting in highly realistic and computationally efficient simulations.
- Applied a volume penalization approach to effectively incorporate obstacles and flame sources and to handle boundary conditions, and mitigated systematic instabilities in temperature advection using smooth indicator functions.

Visiting Student Researcher, Tsinghua University, School of Software

Deep learning with weak annotation for practical detection purpose. Advisor: Prof. Guiguang Ding

Beijing, China
Summers 2020 and 2021

- Carried out experiments and fine-tuned object detection models for brain disorders image recognition, ensuring generalizability for efficient and robust empirical medical applications.
- Contributed to the implementation of an interactive diagnostic software for clinical use, assisting radiologists in validating their own diagnostic results and enhancing their workflow efficiency.

Honors Research Project, McGill University, CS Department

Review of Advection-Reflection Fluid Solver. Advisor: Prof. Paul Kry

Montreal, QC, Canada
Fall 2020

- Replicated the algorithm and rendered the simulation results of smoke plumes interacting with solid obstacles in Blender, utilizing the second-order advection-reflection solver.
- Studied and implemented traditional Eulerian fluid solvers, with a focus on well-established methods like Stable Fluids and MacCormack, and evaluated and compared the detail preservation in their results.

Master Thesis

Eulerian Fluid Simulation with Multiple Vector Fields (*In Progress*)

Dec. 2024 (Expected)

Honors & Awards

Best Paper Award | *SIGGRAPH Asia 2023*

Dec. 2023

Neukom Grants | *The Neukom Institute for Computational Science*

Nov. 2023

Merit-based Master Scholarship | *Dartmouth College*

Sep. 2022 - present

First-Class Honors in Mathematics and Computer Science | *McGill University*

Feb. 2022

Technical Skills

Programming Languages: C++, Python, Java, C#, Matlab, Taichi.

Engines and Softwares: Unity; Maya, Blender, Houdini.

Frameworks and API: OpenGL, OpenCV, Pytorch, Sklearn, Eigen, Qt.

Professional Experience

Lintex Digital Technology Ltd. (Style3D)

Hangzhou, China

R&D Intern - Algorithm Group | C++/Python

June 2024 - present

- Developed the physics-aware triangle mesh optimization algorithms, embedded the physical properties of fabric to its mesh representation, amplified its physical expressiveness using both data-driven and mathematical approach, on purpose of enhancing physical details in cloth simulation and improving the efficiency of cloth modeling.
- Migrated the full industrial-grade cloth simulation pipeline to an independent development and testing environment for research, covering all the engineering tasks from rearranging user inputs, fixing sample points along boundaries, triangulation with constraints, binding physical properties, reconstructing seam-related connectivity, to eventually simulation based on Style3D physics and rendering.

Academic Projects

DARTS Renderer | CS287, Dartmouth College | C++

Fall 2022

- Implemented a Monte Carlo ray tracer featuring advanced capabilities for photorealistic rendering, including photon mapping and volumetric path tracing for both homogeneous and heterogeneous media, with full support for media color rendering.
- Extended the framework's generation capabilities by incorporating additional features, including a microfacet anisotropic BRDF, environment mapping with importance sampling, directional lighting, and a depth-of-field camera.

Collections of Physical Simulation Projects | Comp557&559, McGill University | Java

Fall 2019, Winter 2020

- Completed a series of mini-projects focused on computer graphics and physically-based animation, including the implementation of a collision system, fracture simulation, geodesics in heat, and rigid body transformations.

Game Development Projects

TurboForge | AR & VR | Unity3D × Unity XRI × Meta XR SDK | C#

An immersive mixed-reality car crafting simulator

- Managed and completed migration of all artistic assets and resources from designers, ensured and improved their compatibility with the scripting components.
- Developed selecting and holding system for interactions between player and game objects of multiple layers applied.

Octosquishy | PC Game | Unity3D | C#

A side-scrolling third-person shooting game

- Developed all in-game features from scratch in Unity, including player and enemy behaviors, game systems and mechanics, animations and audioclips integration, and user interface.

Teaching Experience

Teaching Assistant | cose77/277 Computer Graphics | C++ | Dartmouth College

Winter 2023

Certification

Diplôme d'études en langue française (DELF) B2

Permenant