Diyang Zhang

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Education

Dartmouth College **Hanover, NH, U.S.**
M.S in Computer Science with concentration in Digital Arts *2022 - 2024 (Expected)*

McGill University **Montreal, QC, Canada**
B.S with First-Class Honors in Mathematics and Computer Science *2017 - 2022*

University of California, Berkeley **Berkeley, CA, U.S.**
Exchange program with a focus on Computer Science *Summer 2016*

Relevant Coursework

- Computer Graphics
- Differential Geometry
- Computer Vision
- Numerical Analysis
- Machine Learning
- Advanced Algebra
- Physics-Based Animation
- Partial Differential Equation

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 **Hanover, NH, U.S.**
Turbulent fluid mechanics and vortex dynamics simulation. Advisor: Prof. Bo Zhu *Sep. 2022 - present*

- Assembled implicit neural representation into contemporary physical simulation pipeline for more intricate fluid phenomena and more challenging simulation scenarios.
- Devised grid-based algorithm that accurately simulated the intricate vortex behavior using fluids' impulse, achieving physical accuracy while preserving the visual details.
- Investigated the *Clebsch* representation of complex fluid flow using a hybrid vortex particle-grid approach, aimed for a simplified implementation that achieved comparable accuracy while requiring lower-level physics proficiency.

Honors Research Project, McGill University, Math Department **Montreal, QC, Canada**
Fourier spectral method for fire and smoke simulation. Advisor: Prof. Jean-Christophe Nave *Fall 2021*

- Implemented numerical method for fire and flame simulation that relied on Fourier spectral approximations of the Navier-Stokes equations, resulting in highly realistic simulations that achieved computational efficiency.
- Applied volume penalization approach to effectively incorporate obstacles and flame sources, with handling of boundary conditions with high-level physical accuracy.

Visiting Student Researcher, Tsinghua University, School of Software **Beijing, China**
Deep learning with weak annotation for practical detection purpose. Advisor: Prof. Guiguang Ding *Summers 2020 and 2021*

- Conducted extensive experimentation and fine-tuning of object detection models for recognizing brain disorders, for highly robust and efficient diagnostic software tools for empirical medical applications.
- Designed an interactive diagnostic software for usage in clinical practice to improve the accuracy and efficiency of radiologists in different hospitals, based on the accuracy and generalisability of our models.

Honors Research Project, McGill University, CS Department **Montreal, QC, Canada**
Review of Advection-Reflection Fluid Solver. Advisor: Prof. Paul Kry *Fall 2020*

- Replicated the algorithm and render in Blender the simulation result of smoke plume coupling with solid obstacles using second-order advection-reflection solver.
- Evaluated and compared the level of detail-preservation by studying and implementing traditional fluid solvers, including the well-established methods such as SF and MCM.

Honors & Awards

Best Paper Award | *SIGGRAPH Asia 2023* *Dec. 2023*
Neukom Travel 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*

Projects

DARTS Renderer | *CS287, Dartmouth College* | *C++* *Fall 2022*

- Implemented a Monte Carlo ray tracer with highlighted advanced features for photo-realistic rendering, including photon mapping and volumetric path tracing for both homogeneous and heterogeneous media, with support of coloring.
- Extended the capabilities of our framework by incorporating other features such as microfacet anisotropic BRDF, environment map with importance sampling, directional light, and depth-of-field camera.

Collections of Mini 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, finite-element fracture simulation, geodesics in heat and rigid body transformations.

Teaching Experience

Teaching Assistant | *cosc77/277 Computer Graphics* | *Dartmouth College* *Winter 2023*

Professional Experience

Nari-Relays Electric, Co., Ltd. **Nanjing, China**
Software Developer Intern *Summer 2019*

- Redesigned the graphic user interface of data monitoring software in C++ with Qt tools.
- Developed API for seamlessly loading reports into the administration system from xml and json files in real-time.

WangpuData Tech Inc. **Nanjing, China**
Software Developer Intern *Summer 2018*

- Implemented a real-time web scraping tool in Python to extract micro-blogs from selected verified public users.
- Devised a WeChat mini program which automatically gathered trending news about a chosen topic from official accounts.

Technical Skills

Languages: C/C++, Java, Python, Matlab, Taichi
Developer Tools: Visual Studio, Eclipse, PyCharm, Git
Software: Maya, Blender, Houdini
Frameworks and API: OpenGL, OpenCV, Pytorch, Sklearn, Eigen, Qt

Certification

Diplôme d'études en langue française (DELF) B2 *permenant*