

DIYANG ZHANG

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Education

Dartmouth College

M.S in Computer Science with concentration in Digital Arts

Hanover, NH, U.S.

2022 - 2024 (Expected)

McGill University

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

Montreal, QC, Canada

2017 - 2021

University of California, Berkeley

Exchange program with a focus on Computer Science

Berkeley, CA, U.S.

Summer 2016

Relevant Coursework

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

Publication

Fluid Simulation on Neural Flow Maps

ACM Transactions on Graphics (Siggraph Asia 2023) (Accepted)

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

- Assemble neural representation into conventional physical simulation pipeline for more intricate fluid phenomena and more challenging simulation scenarios.
- Devised grid-based algorithm that accurately simulated the intricate vortex behavior in smoke and water simulations, achieving physical accuracy while preserving the fluid's 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 smoke simulation that utilized 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 into fluid simulations, handling 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 using diagnostic reports, for highly effective and efficient diagnostic software tools for real-world 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 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 implementing a variety of other classical fluid solvers that previously employed by convention.

Projects

DARTS | 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.
- Expanded 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.

Honors & Awards

Master Scholarship | *Dartmouth College*

Sep.2022 - present

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

Feb. 2022

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

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

Teaching Experience

Teaching Assistant | *CS77 Computer Graphics* | *Dartmouth College*

Winter 2023

Certification

Diplôme d'études en langue française (DELF) B2

permenant