John Eastman

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EDUCATION

Massachusetts Institute of Technology **Cambridge, MA**

Master of Engineering in Electrical Engineering and Computer Science Expected Sept. 2024

- Concentrations in Computer Graphics and Artificial Intelligence GPA: 5.0/5.0
- Notable Courses: Computational Design and Fabrication, Advances in Computer Vision, Machine Learning for Inverse Graphics, Shape Analysis, Advanced Computational Photography.

Bachelor of Science in Computer Science and Engineering June 2023

- Minor in Japanese GPA: 4.7/5.0
- Notable Courses: Computer Graphics, Design and Analysis of Algorithms, Operating System Engineering, Computer Systems Engineering, Software Construction, Machine Learning.

EXPERIENCE

MIT Electrical Engineering and Computer Science Dept. **Cambridge, MA**

Graduate Teaching Assistant Sept. 2023 – Dec. 2023

Undergraduate Teaching Assistant Sept. 2022 – Dec. 2022

- Served as a TA for the Advanced Undergraduate Subject: Computer Graphics (6.4400) in Fall ’22 and Fall ‘23.
- Conducted office hours, addressed student queries on Piazza, graded exams and homework assignments.

Second Front Systems **Remote**

Data Science Intern July 2023 – Aug. 2023

- Engineered Dash and Plotly dashboards with dynamic filtering and pagination for real-time data visualization.
- Implemented polynomial regression models for advanced trend analysis and future performance prediction.
- Structured the Python codebase for modularity and Docker deployment.

MIT Computer Science and Artificial Intelligence Laboratory **Cambridge, MA**

Undergraduate Researcher - Computational Design and Fabrication Group Feb. 2023 – Aug. 2023

- Collaborated with a multidisciplinary team to develop a rigid body physics simulation for underwater gliders.
- Implemented differentiable hydrodynamic forces, including lift and drag, as well as changes in mass into Nvidia’s differentiable simulation Python framework “Warp”, utilizing CUDA acceleration.
- Optimized glider hull design using gradient descent on differentiated forces with respect to glider shape.
- Enabled glider to optimize controls for faster horizontal speed or faster vertical descent.

Intel Corporation **Remote**

3D Acceleration Software Engineer Intern May 2022 – Aug. 2022

- Developed discrete GPU driver updates to resolve bugs and enhance Direct3D performance for Windows.
- Performed in-depth GPU performance profiling and analysis utilizing advanced analysis tools.
- Engaged with modern DirectX9, DirectX11, and DirectX12 3D titles in Windows.
- Provided technical support to developers using GPU systems for performance analysis.

PROJECTS

Mesh Simplification for Accelerated Physics Simulation

- Engineered Garland-Heckbert mesh decimation and Van Gelder volume decimation algorithms in C++.
- Integrated Finite Element Method (FEM) for non-linear physics simulation on simplified meshes.
- Implemented Biharmonic weights to project simulated deformation from simplified mesh to the original mesh.

Improved Loss Function for Frame Recurrent Video Super Resolution

- Augmented original implementation of FRVSR model in Python using PyTorch and retrained it.
- Integrated cutting-edge pre-trained RAFT flow network model to increase flow accuracy.
- Developed novel loss function, leveraging Perceptual Loss using VGG19 model to improve visual quality.

Photon Mapping

- Implemented a raytracing algorithm in C++, incorporating refraction, total internal reflection (via Snell's law), and global illumination through Photon Mapping with k-d tree acceleration.

SKILLS

Programming Languages: C++, C, Python, C#, Java, Julia, MATLAB

Frameworks: Direct3D (DirectX), OpenGL, PyTorch, NeRF, Blender, UNIX, Unity Game Engine, Arduino, ESP32

Proficiencies: Computer Graphics, Computer Vision, Machine Learning, Operating Systems, Embedded Systems