Jeff Tan

CONTACT
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EDUCATION
Carnegie Mellon University, Pittsburgh, PA
M.S. in Robotics (expected)   08/2023 - 05/2025
B.S. in Computer Science, GPA: 3.95/4.00   08/2019 - 05/2023

- Concentrations: Computer Systems, Computer Graphics, and Algorithms
- Thesis: *Distilling Neural Fields for Real-Time Articulated Shape Reconstruction*

RESEARCH
Center for Autonomous Vehicle Research, Carnegie Mellon University
Undergraduate Researcher   01/2022 -

- Researching 3D reconstruction of freely moving non-rigid objects from videos.
- Proposed a method to learn a real-time feed-forward shape predictor for humans and quadrupeds, by distilling knowledge from existing differentiable rendering optimizers. Our method runs on unseen monocular videos at 15 fps, and is 600x faster than differentiable rendering baselines. [Project Page] [Paper]
- Advised by Prof. Deva Ramanan and mentored by Gengshan Yang

Intelligent Autonomous Manipulation Lab, Carnegie Mellon University
Undergraduate Researcher   02/2021 - 05/2022

- Researching self-supervised visual learning for robotic manipulation from demonstrations.
- Proposed a method to allow self-supervised visual feature learning at scale without expensive data collection, by procedurally generating synthetic RGB-D scenes from mesh datasets.
- Work presented as a poster at CMU's undergraduate research symposium.
- Advised by Prof. Oliver Kroemer and mentored by Jacky Liang

Biorobotics Lab, Carnegie Mellon University
Research Assistant   03/2020 - 02/2021

- Developed localization and mapping algorithms to build evolving 3D environment maps for search and rescue snake robots. My work forms the basis of the snake robot's perception stack.
- Advised by Prof. Howie Choset and mentored by Julian Whitman.

PUBLICATIONS
Jeff Tan, Gengshan Yang, and Deva Ramanan. "Distilling Neural Fields for Real-Time Articulated Shape Reconstruction." *CVPR 2023*. [Project Page] [Paper]

Yanyi Ding, Zhiyi Kuang, Yuxin Pei, **Jeff Tan**, Ziyu Zhang, and Joseph Konan. "Using Deep Learning Sequence Models to Identify SARS-CoV-2 Divergence." *arXiv 2021*. [Paper]

TEACHING
Carnegie Mellon University, Pittsburgh, PA

- **Teaching Assistant**, Physics-Based Rendering (15-468)   01/2023 - 05/2023
- **Teaching Assistant**, Parallel Computation (15-418)   08/2021 - 05/2023
- **Teaching Assistant**, Introduction to Computer Systems (15-213)   08/2021 - 12/2021

AWARDS
NSF Graduate Research Fellowship   2023

CMU Alumni Award for Undergraduate Excellence   2023

CMU School of Computer Science Dean's List, High Honors, All Semesters   2019 - 2022

CMU Summer Undergraduate Research Fellowship   2021

PROJECTS	**Lab4D** [Github] [Docs] An open-source codebase for dynamic 3D reconstruction from videos.

PROJECTS

Lab4D   [Github] [Docs]

An open-source codebase for dynamic 3D reconstruction from videos.

Dirt Renderer   [Report]

A physics-based renderer for photorealistic images, written for CMU 15-468 following PBRT in C++. I implemented Monte Carlo path tracing using physically realistic materials, procedural texturing, and importance sampling, as well as support with bidirectional path tracing and volume rendering.

Hulk Compiler   [Report]

A compiler for a type-safe subset of C, written from scratch for CMU 15-411 in OCaml. We support static single assignment, register allocation, dataflow analysis, alias analysis, constant and copy propagation, dead code elimination, and many other optimizations, outperforming `gcc -01` by 20% on course benchmarks.

DAQ Live

A live web dashboard for an all-electric racecar that streams vehicle status and selected sensor measurements over LTE in real-time, written in React. Our system is used during track testing and racing to review old data logs, update parameters during a race, and assist with design decisions.

WORK EXPERIENCE

Bodo AI

Software Engineer Intern, Pittsburgh, PA   05/2022 - 08/2022

- Worked on a JIT compiler that auto-parallelizes Python and SQL by emitting low-level MPI code, speeding up data analytics workloads on a cloud-native database by orders of magnitude.
- I implemented parallel and streaming I/O between Python dataframes and Snowflake tables, outperforming Spark on internal benchmarks. I also extended Bodo's coverage of SQL operators and scikit-learn utilities, and worked on a buffer pool for memory-limited streaming workloads.

KLA Corporation

Algorithms Intern, Ann Arbor, MI   05/2021 - 08/2021

- Researched physics-informed neural networks for solving forward and inverse problems involving partial differential equations, towards fluid dynamics and photolithography simulations.
- We found that implicit neural networks can interpolate PDE solutions and identify constants.

SKILLS

Programming: Python, C++17, C, OCaml, JavaScript, x86 Assembly

Software: PyTorch, JAX, Tensorflow, NumPy, CUDA

Languages: English (native), Chinese (native)

COURSEWORK

Carnegie Mellon University, Pittsburgh, PA

- *Graphics*: Computer Graphics (15-462), Computational Photography (15-463), Physics-Based Rendering (15-468), Learning-Based Image Synthesis (16-726)
- *Systems*: Computer Systems (15-213), Computer Security (15-330), Compiler Design (15-411), Parallel Computation (15-418), Database Systems (15-445)
- *Algorithms*: Complexity Theory (15-445), Discrete Differential Geometry (15-458), Cryptography (15-356), Quantum Computation (15-459)
- *Other*: Deep Learning (11-785), Programming Languages (15-312), Robot Kinematics and Dynamics (16-384), Matrix Theory (21-242)