Jiezhi "Stephen" Yang

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EDUCATION

Harvard University, *ME. CSE (Thesis Track)*, **GPA**: 4.00/4.00 *Aug. 2023 - May 2025*
Massachusetts Institute of Technology, EECS Cross-registration, **GPA**: 5.00/5.00 *Aug. 2023 - May 2025*
University of California, Berkeley, *B.A. Honors CS, Cognitive Science*, **Major GPA**: 4.00/4.00 *Aug. 2019 - May 2023*
Courses: DL, ML, CV, LLM, AI, OS, Algorithms, Embedded Intel., Distributed Computing, (Inverse) Graphics, Optimizations, etc.
Teaching: Taught Deep Learning, AI, and Data Structures; led discussion sections, review sections, and homework parties, etc.

INDUSTRY EXPERIENCE

Machine Learning Engineer Intern, Qualcomm Inc. (qualcomm.com) *May 2024 - Aug.2024*
Spearheaded *QSCENT DL*: pivotal deep learning research for novel on-device smell/gas prediction sensor algorithm using edge AI.

- Designed, implemented, and trained a CNN based Siamese network for smell predictions using PyTorch, achieved 97+% accuracy, and proved robustness against unknown, in-the-wild environment-induced signal drifts via Siamese network.
- Devised UNet for electrical signal baseline generation and Physics-informed NN, further reducing performance perturbations.
- Developed end-to-end pipelines for large-scale time-series electrochemical data cleaning, feature extraction, and ablations.

Software Engineer Intern, Robert Bosch GmbH (bosch.com) *May 2021 - Aug. 2021*
Built *pred and viz of voxel-wise traffic visibility*, by ray-tracing from traffic LIDAR camera data for infrastructure-based self-driving.

- Implemented prediction algorithm in ROS2 C++, sped up 70% by OpenMP, cache blocking, and OcTree acceleration structure.
- Developed algorithms to model FOVs and reliability variances of LIDAR, Radar, and camera with OctoMap in C++.
- Devised an interactive Rviz GUI for configuring and simulating self-driving sensor setup, enhancing autonomous driving sensor testing with real-time FOV, reliability, and visibility renderings. Adopted teamwide, saving 5 hrs manual efforts per test.

RESEARCH EXPERIENCE

Deep Learning Research Assistant, Berkeley Artificial Intelligence Research Lab (bair.berkeley.edu) *May 2022 - Sep.2023*
First-authored *CARFF (ECCV Accepted):* Auto-encoded Radiance Field to predict future 3D scenes from past 2D observations.

- Developed a ViT Pose-Conditional VAE w/ PyTorch to encode view-invariant scene latents for CARLA driving datasets.
- Devised mixture density model & NeRF Decoder w/ GUI to forecast and 3D reconstruct future scenes under uncertainty.
- Halved crashes and doubled efficiency in realistic self-driving simulations, where GAN-based models will mode collapse.

Spearheaded *360Long*: Wide-range video reconstructions for VR applications by devising efficient multi-sphere images (MSIs).

- Enabled 3D scene capturing in portable devices, via performing NN on scene radii to cluster and redistribute MSI spheres.
- Interpolated MSIs as a plenoptic tunnel for wider reconstruction. Achieved 12% PSNR increase and faster convergence.

Computer Vision Research Assistant, MIT CSAIL (csail.mit.edu) *Dec. 2023 - May 2024*
First-authored *DreamScenes:* Text-conditioned 3D gen via multistep diffusion, LLM, ControlNet, and differentiable rendering.

- Implemented geometry conditioned, masked stable diffusion based pipeline with gaussian splatting for 3D reconstruction.
- Generated photorealistic, finely controlled and textured 3D scenes from text for 3D digital content creation and VR, etc.

Research Fellow, Harvard Visual Computing & Computational Robotics Group *May 2023 - May 2024*
Led *IADP*: Addressed robotics domain variability & adaptation with invariant-adaptive compositional transformer diffusion model.

- Leveraged anti-causal domain shifts to use orthogonal diffusion models to capture domain invariant and specific information.
- Implemented and trained to push objects (RL tasks), and demonstrated 3x increased performance under few-shot fine turning.

Spearheaded *SportsNerf*: A unified network for the reconstruction of all human players in monocular sports broadcasting.

- Estimated skeleton motion transformations via math and transposed CNN upsampling for many players using PyTorch.
- Enhanced few-shot capabilities via re-id fine-tuned CLIP-feature-based multi-resolution grids, achieved 70% faster training with no SSIM score reduction. Utilized OpenCV, YOLOv8, sklearn, and 8 Tesla V100 CUDA GPUs for parallel computing.

TECHNICAL SKILLS

Languages: Python, Java, C/C++, SQL, JavaScript, LaTeX, RISC-V Assembly, Markdown, etc.
Libraries/Tools: PyTorch, OpenCV, Scikit-learn, NumPy, Pandas, Seaborn, Git, OpenMP, ROS2, Docker, Azure, Amazon EC2, etc.

PUBLICATIONS & AWARDS

CARFF (first author)*: Conditional Auto-encoded Radiance Field for 3D Scene Forecasting* **ECCV 2024**: carff.website
DreamScenes (first author)*: 3D Textured Scene Generation Via Compositional Diffusions* **Draft Paper***: tinyurl.com/dreamscenes*
ALIA*:Diversify Vision Datasets with Automatic Diffusion-based Augmentation* **NeurIPS 2023**: lisadunlap.github.io/alia-website.
Awards: High Distinction; RISELab Summer Research Fellowships, CS Honors Society, Term Honors, Valedictorian, etc.