

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, exam reviews/drafting, homework parties, etc.

INDUSTRY EXPERIENCE

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

- Designed, implemented, and trained CNN & Transformer encoders for smell predictions via PyTorch, achieved 97% accuracy.
- Increased robustness against environment variations via Siamese network and UNet electrical signal baseline generation and removal, alongside historical context learning & physics-informed NN to predict gas concentrations with less than 15% error.
- 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 2024 Accepted): A deep learning pipeline to predict future 3D scenes from past visual 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 vision conditioned robotics domain adaptation via invariant-adaptive compositional transformer diffusions.

- Leveraged anti-causal domain shifts to use orthogonal diffusion models to capture domain invariant and dependent 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 visual reconstruction of all human players from monocular sports broadcasting.

- Reconstruct via re-id fine-tuned CLIP-based multi-resolution grid NeRF; estimated skeleton transforms from transposed CNN.
- Achieved single-shot visual reconstruction, 70% faster training with no SSIM reduction. Used 8 GPUs for parallel training.

TECHNICAL SKILLS

Languages: Python, Java, C/C++, SQL, JavaScript, LaTeX, RISC-V Assembly, Markdown, etc.

Libraries/Tools: PyTorch, OpenCV, sklearn, NumPy, Pandas, Seaborn, TensorFlow, Git, OpenMP, ROS2, Docker, Azure, YOLO.

PUBLICATIONS, PATENTS, AWARDS

[1] CARFF (first author): Conditional Auto-encoded Radiance Field for 3D Scene Forecasting ECCV 2024: carff.website
[2] DreamScenes (first author): 3D Textured Scene Generation Via Compositional Diffusions Draft Paper: tinyurl.com/dreamscce
[3] ALIA: Diversify Vision Datasets with Automatic Diffusion-based Augmentation NeurIPS 2023: lisadunlap.github.io/aliam-website.
[4] Qualcomm Patent: Gas Detection by Miniaturized Electrochemical Device via Deep Learning, scheduled filing Q4/2024.
Awards: Berkeley High Distinction; RISE Lab Summer Research Fellowships, CS Honors Society, Term Honors, Valedictorian, etc.