Rio Aguina-Kang

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AI/ML Research Engineer | 2D/3D Vision & Generative Modeling | Improving AI w/ Large-Scale Crowdsourcing

Technical Skills

Machine Learning & Deployment: PyTorch, TensorFlow, Hugging Face (transformers, diffusers), scikit-learn, timm, Docker, Weights & Biases, AWS S3, Run:AI
Computer Vision & 3D Graphics: OpenCV, PyTorch3D, Open3D, nvdiffrast, Blender, trimesh, polyscope, three.js
Data Analysis & Visualization: Pandas, NumPy, SciPy, Matplotlib, NLTK, SQL, d3.js
Software & Web Development: Git, GitHub, Flask, Node.js, MongoDB, Slurm, JUnit, HTML/CSS/JS
Model Expertise: LLMs, Transformers, Diffusion, GANs, NeRF/GSplat, CNNs, RNNs, Object Detection/Segmentation

Experience

Cognitive Tools Lab @ Stanford   Sept 2022 – Present
Research Engineer   *Palo Alto, CA*
- Designing behavioral experiments and leading **full-stack development of their web applications**, collecting **90K+ multimodal data samples** spanning sketch, audio, visualization, and text-to-image tasks.
  * Build and maintain a sketch-generation platform collecting 90K+ human & AI sketches across 128 categories; benchmark recognition with 17 CV models and collect audio annotations from participants.
  * Develop interactive visualization tools (RAWGraphs, d3.js) enabling dataset-driven graph creation for 100+ users.
  * Design user-facing UIs that integrate with Stable Diffusion to generate images from user-highlighted text, supporting narrative adaptation in creative work.
- Engineer analysis pipelines in Python and R to deploy mixed-effect regression models and run A/B tests, evaluating model performance and user behavior.
- Contribute to open-source dataset releases and assist in manuscript preparation.

Adobe   June 2024 – August 2025
Research Scientist/Engineer Intern   *San Jose, CA*
- Engineered an image-to-3D generative pipeline for structured scene reconstruction, leveraging foundation models for segmentation, depth estimation, and VLM-guided object removal.
- Designed and implemented depth-alignment algorithms (MLP-based, PyTorch) improving object fitting accuracy in monocular settings.
- Built a custom RANSAC-inspired algorithm for aligning pointclouds of reconstructed 3D objects to noisy depth maps.
- Utilized cloud infrastructure and GPU scheduling tools (Run:AI) for testing, benchmarking, and training of ML systems.
- Achieved **12.6 % F-Score** and **14.5 % IoU** improvements on existing benchmarks; publication accepted to 3DV 2026.

Visual Computing Group @ Brown   June 2023 – June 2025
Research Intern   *Providence, RI*
- Developed a zero-shot generative model for open-world 3D scene synthesis leveraging LLMs to describe room layouts through object descriptions and relational constraints.
- Built GPU-accelerated retrieval system indexing **900K+ 3D objects and 500 textures** in CLIP latent space with log-time similarity search (FAISS).
- Engineered a custom domain-specific language (DSL) for prompting LLMs to generate scene layouts.
- Built analysis and evaluation pipelines, including computing precision/recall metrics.

Selected Publications

- Gumin, M., Han, D., Yoo, S., Ganeshan, A., Jones, R. K., **Aguina-Kang, R.**, Morris, S., and Ritchie, D. (2025). Procedural Scene Programs for Open-Universe Scene Generation: LLM-Free Error Correction via Program Search. *SIGGRAPH Asia.* [PDF]

- Mukherjee, K.*, Huey, H.*, Lu, X.*, Vinker, Y., **Aguina-Kang, R.**, Shamir, A., and Fan, J. (2023). SEVA: Leveraging Sketches to Evaluate Human–Machine Visual Alignment. *NeurIPS (Datasets & Benchmarks).* [Website] [PDF]

- **Aguina-Kang, R.***, Gumin, M.*, Han, D.*, Morris, S.*, Yoo, S*., Ganeshan, A., Jones, K., Wei, Q., Fu, K., and Ritchie, D. (2024). Open-Universe Indoor Scene Generation using LLM Program Synthesis and Uncurated Object Databases. *arXiv preprint.* [PDF]

- Additional publications and preprints available on my Google Scholar

Education

University of California, San Diego   Sept 2021 – June 2025
B.S. Cognitive Science (Machine Learning specialization), Dual Minor in Data Science & Mathematics   *La Jolla, CA*
Provost Honors (GPA: 3.7)