Harrison Chojnowski

chojnowski.h@ufl.edu | (702) 355-5729 | github.com/hachoj/

Education

B.S. Computer Science, B.S. Mathematics, *University of Florida* 08/2024 – 05/2027
Gainesville, FL

- GPA 3.95/4.00.
- Relevant Coursework: Deep Learning in Medical Image Analysis, Linear Algebra for Data Science, Real Analysis with Advanced Calculus I & II.

Professional Experience

Researcher, *MIRTH AI Lab* 2024 – present
Gainesville

- Trained diffusion and flow-matching generative models for high-fidelity medical image synthesis.
- Developed implicit neural representations (INRs) for continuous, resolution-independent volumetric analysis.
- Implemented GRPO pipelines to align model reasoning with expert clinical reports.

Paid OPS Researcher, *University of Florida* 2025 – Present
Gainesville

- Built feature extraction pipelines across medical imaging modalities including ultrasound.
- Trained semantic embeddings from clinical reports using LLMs for image-text alignment.

Publications

Geometry-Aware Implicit Neural Reconstruction of Oblique Micro-Ultrasound Scans, *In Review at MIDL - First Author* 2026

- 9% SSIM improvement over baselines by replacing linear interpolation with a learned model, preserving diagnostic high-frequency texture.
- Reconstructed coherent 3D volumes from oblique slices, enabling histopathology label mapping for supervised cancer detection.
- Proposed generalized INR framework using HAT encoder with shifted-window cross-attention for continuous inter-slice modeling.

AortaGPT: An Interactive Vision-Language System for Aortic CT Analysis, 2026
In Review at CVPR - Second Author

- Built first interactive vision-language system for aortic analysis; LLM controller orchestrates super-resolution, segmentation, and diameter measurement in a unified interface.
- 54.01 dB PSNR via novel Arbitrary-Scale Super-Resolution module using INRs; restored low-res segmentation to near high-res parity (DSC 0.7903 vs. 0.7958).
- Surpassed clinical expert consistency ($R^2 = 0.963$) with automated pipeline computing orthogonal diameters across 14 anatomical zones.

Projects

PixArt/SD3 from Scratch
- Implemented full MMDiT architecture from scratch in both JAX/Equinox and PyTorch.
- Built 22M-image pipeline using Qwen3-VL-8B (FP8) via vLLM for dense captions (~320 tokens) and SD3 VAE latents.
- Four-stage training: class-conditional ImageNet-1k pretraining → weight reparameterization → text-conditioned (T5-Gemma) training on ImageNet-21k + 8M curated images at 256x256 and 512x512.
- Rectified flow with SD3-inspired design: calibrated scaling (α=1.75) for resolution progression, 10% CFG dropout, EMA scheduling.

Skills

Machine Learning Tools
- PyTorch, Transformer Engine, JAX (Flax/Equinox), Orbax, Grain, Triton, NVIDIA DALI, DDP/FSDP, Weights & Biases, Git, Linux/Unix

Mathematical Foundations
- Information theory, measure-theoretic probability, optimal transport, optimization on manifolds.

Machine Learning Concepts
- Predictive/self-supervised representation learning, embedding geometry & invariances, domain shift & representation drift, metric learning & retrieval, diffusion/rectified flow.

Programming
- Python, C++.