

## SUMMARY

**Research-focused computer scientist** working at the intersection of **computer vision** and **generative modeling**, with experience in **3D biomedical imaging**, multimodal perception, and computational photography, and industry experience at **Stripe**. Strong background in 2D/3D vision, federated learning, and **likelihood- and perception-driven generative models**, developed through hands-on research and analysis.

## EDUCATION

- **Birla Institute of Technology and Science, Pilani** Pilani, India  
*Bachelor of Engineering in Computer Science; CGPA: 8.80/10.0; Expected graduation: Jun. 2026* Oct. 2022 – Present
  - **Core Coursework:** Data Structures and Algorithms, Object Oriented Programming, Operating Systems, Database Systems
  - **Relevant Coursework:** Generative AI, Deep Learning, Linear Algebra, Probability & Statistics, Introduction to LLMs, Natural Language Processing
- **Deens Academy, ECC Road** Bengaluru, India  
*Grade XII - Computer Science; CBSE Examinations: 97.6%* Mar. 2021 – Jul. 2022

## EXPERIENCE

- **3D Tubular Instance Segmentation in Biomedical Imaging** Boston, MA  
*Research Intern under Dr. Donglai Wei, Boston College* Sept. 2025 – Present
  - Working on **SkelAffinity-Seg**, a segmentation pipeline combining SDT, watershed supervoxels, RAG, and affinity learning.
  - Adapting a Point Affinity Transformer to capture global shape to predict pairwise affinities, correcting merge and split errors.
  - Analysing generalisation across ME2-Beta, ME2-Mossy, RibSeg v2; emphasising merge/split failure modes in SDT prediction.
  - Evaluating and refining affinity reasoning through point sampling, attention behaviour, and clustering sensitivity analyses.
- **mmWave Radar to Speech Enhancement** Pilani, India  
*Research Assistant under Dr. Sandeep Joshi, BITS Pilani* Oct. 2025 – Present
  - Working on mmWave **radar-conditioned speech reconstruction** from band-limited, noisy non-contact radar signals.
  - Extending **diffusion** (DiffWave, CDiffuSE) and **GANs** (CleanMel+Vocos) for speech intelligibility under radar conditioning.
  - Comparing diffusion and GAN-based approaches to characterise trade-offs in stability, intelligibility, and perceptual quality.
  - Addressing loss-metric mismatch via error analysis (spectrograms, feature maps) to guide architecture and loss design.
- **Stripe** Bengaluru, India  
*Software Developer Intern* May 2025 – Jul. 2025
  - Saved **\$200K** per annum by reducing **700K** manual verifications for merchant addresses using LLMs.
  - Conducted prompt engineering experiments with **1,000** user addresses to reduce the LLM's false rejection rate to **<2%**.
  - Created an abstract framework to reduce time to create new LLM verification systems from **~ 2 weeks** to **~ 1 day**.
- **Computational Photography using Federated Learning** Pilani, India  
*Research Assistant under Dr. Pratik Narang, BITS Pilani* Aug. 2024 – May 2025
  - Developed a federated learning solution for advanced digital image processing on RAW images while preserving data privacy.
  - Evaluated federated denoising using 7 noise models, based on 20+ studies, across 13 architectures including DBSN, DnCNN.
  - Trained Blind2Unblind architecture using federated clients on custom noise models, achieving 47.28 dB PSNR, 0.98 SSIM.

## PROJECTS

- **3D Semantic Segmentation of EPFL Electron Microscopy Dataset** May 2025 – Jul. 2025
  - Investigated 3D EM semantic segmentation using classical, nnU-Net, and foundation-model-based approaches.
  - Pre-trained PCT-Net via Volume Fusion on unannotated volumes to learn transferable 3D representations.
  - Performed systematic ablations on preprocessing, Focal Dice, schedulers, postprocessing; improved Dice from 42% to 93%.
- **Implementation of Conditional PixelVAE, PixelCNN for Handwritten Digit Generation** Feb. 2025
  - Reproduced PixelCNN, conditional PixelCNN, and PixelVAE architectures, validating training stability and likelihood.
  - Designed and implemented a conditional PixelVAE by extending the autoregressive decoder for controlled generation.
  - Achieved strong quantitative performance on binarised MNIST dataset with average NLL of 0.169 nats per pixel.
- **From-Scratch Neural Learning in NumPy via Adam Optimisation** Jan. 2025
  - Constructed the Adam optimiser from scratch and visualised optimisation effects via decision boundary evolution.
  - Analysed optimisation dynamics by comparing SGD and Adam, studying convergence behaviour and stability.
- **Analysis of Smoking and Drinking Effects on Health Metrics** Sep. 2023
  - Performed rigorous preprocessing on 10,000+ health records and conducted EDA to identify trends across 15+ metrics.
  - Boosted accuracy from 54% to 72% by evaluating models like Logistic Regression, Random Forest; gained 33% via tuning.

## PROGRAMMING SKILLS

- **Languages:** Python, Ruby, Java, C/C++, SQL
- **Technologies:** PyTorch, NumPy, Matplotlib, Keras, TensorFlow