

Anuvind Pramod

Master's Thesis Fellow | Jug Lab, Human Technopole, Milan
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Research Interests

• AI in Medicine • Deep Learning for Medical Imaging • Computer-Aided Diagnosis • Vision Transformers (ViT) • Multi-modal Learning in Healthcare • Interpretable AI for Clinical Decision Support

Education

BS-MS Dual Degree (Inter-Disciplinary) *Dec 2021 – May 2026 (Expected)*
Indian Institute of Science Education and Research (IISER), Pune, India

Master's Thesis in Data Science: *Deep Learning for Breast Cancer Risk Prediction from Mammography*
Jug Lab, Human Technopole, Milan, Italy *June 2025 – Present*
Advisor: Dr. Florian Jug

Research Experience

- **Biological Age Estimation from Mammography for Breast Cancer Risk Stratification**
Master's Thesis, Jug Lab, Human Technopole, Milan *July 2025 – Present*
 - Developed an end-to-end deep learning framework for predicting biological age from screening mammograms, achieving **MAE of 3.2 years**—a **60% improvement** over previous state-of-the-art methods.
 - Designed a novel architecture combining distilled DINOv3 backbones with hierarchical multi-head attention mechanisms for robust feature extraction.
 - Investigating the clinical utility of “age gap” (biological vs. chronological age) as a novel imaging biomarker for personalized breast cancer risk assessment.
 - Trained models on large-scale multi-institutional mammography datasets on HPC infrastructure.
- **Deep CNN Architecture for Histopathology Image Classification**
Course Project: Medical Image Analysis, IISER Pune *Feb 2025 – Apr 2025*
 - Designed a custom deep CNN with stacked convolutional blocks, batch normalization, and progressive dropout for multi-class lung and colon cancer classification.
 - Achieved near-perfect performance with **99.58% test accuracy** and **0.9999 AUC** on the LC25000 benchmark, validating the custom architecture against standard ResNet baselines.
 - Conducted ablation studies to analyze the contribution of architectural components to model performance.
- **Single-Cell Transcriptomic Analysis of YAP/TAZ in Breast Cancer**
Tumor Microenvironment Lab & Leelavati Lab, IISER Pune *Aug 2024 – Jan 2025*
 - Developed a reproducible Python-based scRNA-seq analysis pipeline using Scanpy for the laboratory.
 - Investigated co-expression patterns and functional redundancy of YAP and TAZ transcriptional co-activators in breast cancer cells versus normal mammary epithelial cells.
 - Applied dimensionality reduction, clustering, and differential expression analysis to characterize cell-type-specific transcriptional programs.
- **Spatial Protein Expression Analysis in Breast Tumor Microenvironment**
Tumor Microenvironment Lab, IISER Pune *Jan 2024 – Aug 2024*

- Analyzed THBS1 expression patterns across tumor cell types using multiplex immunofluorescence imaging with PanCK and CD3 cell-type markers.
- Performed quantitative image analysis using Halo and inForm software to characterize spatial relationships in the tumor microenvironment.

- **Computational Optimization for Sustainable Aviation Fuel Production**

iGEM IISER Pune 2023

Feb 2023 – Nov 2023

- Headed Measurements division (statistical modeling) and the Wet Lab team (gene knockouts).
- Designed optimal production conditions using Design of Experiments (DoE) and statistical learning approaches.
- Team achieved: **Best Education Award**, nomination for **Best Climate Crisis Project**, and **Top-10 global ranking** among undergraduate teams at iGEM Jamboree, Paris.

Technical Skills

Machine Learning & AI:

- PyTorch, scikit-learn
- Vision Transformers (ViT, DINOv3, Swin)
- CNNs, Attention Mechanisms
- Transfer Learning, Fine-tuning
- Model Interpretability (GradCAM, SHAP)

Programming & Computing:

- Python, C++, Bash scripting
- HPC/SLURM, Distributed Training
- Git, Linux

Medical Image Analysis:

- Mammography, Histopathology
- Multiplex IF (Halo, inForm)
- DICOM handling, Image preprocessing
- Whole-slide image analysis

Bioinformatics & Data Science:

- Single-cell RNA-seq (Scanpy, Seurat)
- Statistical Modeling, DoE
- Data Visualization (Matplotlib, Seaborn)
- Molecular Docking (AutoDock)

Relevant Coursework

Machine Learning • Deep Learning • Computer Vision • Statistical Inference • Linear Algebra • Bayesian Approaches • Computational Biology • Cancer Biology • Molecular Cell Biology

Selected Presentations

- **Poster:** “Deep Learning-Based Mammographic Age Estimation: Towards an Image-Based Biomarker for Cancer Risk Prediction”
Cancer Research UK Data-Driven Cancer Research Conference, Edinburgh International Conference Centre, UK. 24–26 February 2026 (Accepted)

Honors & Awards

- **Best Education Award** and **Top-10 Global Undergraduate Ranking**, iGEM Jamboree, Paris 2023
- Nominated for **Best Climate Crisis Project**, iGEM Jamboree, Paris 2023
- **G-20 Delegate**, “Accessible Science” event, representing IISER Pune June 2023
- Graduated with Distinction, 12th Grade (92.1%) 2020

Leadership & Service

- **Athletics Captain**, Sports Club, IISER Pune Sept 2024 – Jan 2025
- **Head of Media**, Student Media Body, IISER Pune Nov 2022 – Dec 2023

References

Dr. Florian Jug

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Dr. Ruggiero Santeramo

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