EMIR MUHAMMET ARAN

Medical AI & Longevity Researcher | Computer Engineering
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SUMMARY

Computer Engineering researcher modeling cellular senescence and tissue aging with generative vision models and large-scale spatial multi-omics. Seeking a summer 2027 internship in medical imaging AI; experienced taking models to deployment (FastAPI, Docker, HuggingFace Spaces).

EDUCATION

Gazi University, B.S. Computer Engineering | GPA: 3.54 / 4.00 — **Expected January 2028**

WORK EXPERIENCE

Spatial Multi-Omics Researcher | *Solvien Research Program,* **GitHub**, **Blog** — **May 2026 – Present (Exp. Mar 2027)**

- Built a 38-ch PhenoCycler (CODEX) pipeline (NIH SenNet, 51 sections) with Zarr & GPU CellposeSAM v2 dual-mask extraction (47.6M+ cells); co-registered 1.04M 10x Xenium cells.
- Trained a zero-leakage 5-class MLP + protein gates (30 lineage channels, Mahalanobis/Wasserstein OOD audit; pivoted from scMRDR VAE after LODO Go/No-Go audit, r=0.055–0.208 vs. Ridge 0.239–0.268); 20,480 DBSCAN islets (10k-permutation nulls, macrophage p < 1e-4) & gH2AX/HMGB1/Lamin B1 profiling.

AI Intern (RAG & LLM Systems) | *Sisoft Healthcare Information Systems,* **GitHub** — **Aug 2026**

- Authored two LLM/RAG research reports (32 pages, 100+ sources); built an Agentic RAG prototype (ModernBERT-TR, FAISS, PyPDFLoader, LangChain tools, Gemini 3 Flash, Streamlit) over 7 corporate PDFs with grounding checks (15/15 queries).

IoT Engineer Intern | *Gibrin Robotics, TOBB Garaj* — **Jun 2025 – Sep 2025**

- Streamed ESP32 (Arduino) sensor data to Firebase and Flutter with alerts; optimized 15-second polling and added RBAC across 3 modules.

PROJECTS

MSC Aging Simulation: LDM vs. CycleGAN/CUT (Senior Thesis, in prep for bioRxiv | **GitHub**): Label-free MSC aging (young-to-senescent, 8,312 cells). Vs. CycleGAN/CUT: CUT led FID (43.13/48.58); LDM (SDEdit) led bidirectional accuracy (89.4%/87.9% vs. CUT 72.5%/94.7%) & 5-seed stability (FID 48.81±0.99 / 54.00±0.54); ResNet-18 morphology checks; local Gradio.

AURA-Twin AI: Explainable Clinical Digital Twin (DeepSeek-R1 7B) (QLoRA / EHR | **GitHub**): Fine-tuned DeepSeek-R1-Distill-Qwen-7B (4-bit QLoRA, SDPA) on 10-year EHRs to generate 23+ biomarker forecasts (+15 to +180d). MMLU Medical Score 26.67% to 42.50% (3-seed n=30/task); FastAPI SSE (~13 tok/s) + React.

BraTS 2020: Brain Tumor MRI Segmentation (**GitHub** | **Demo**): U-Net + EfficientNetB0 (from-scratch, Focal Loss): 0.89 Mean Dice (0.91 Edema, 0.89 Enhancing, 0.86 Necrotic), 0.80 IoU, 90.34% sensitivity on 320-slice val subset (slice-level split); Gradio.

Breast Cancer Histopathology Detection (**GitHub** | **Demo** | **Blog**): 164K-param CNN on PatchCamelyon lymph node patches: 91.5% sensitivity, 81.1% specificity, 0.941 AUC (55,505 held-out patches, Focal Loss, recall thresholding); HF Spaces demo.

15-Class Chest X-Ray Disease Classification (**GitHub** | **Demo** | **Blog**): Multi-label EfficientNetB0 (patient-level split) addressing extreme long-tail imbalance (~50k normal vs. <300 rare cases) and label noise via rare-class oversampling and TTA to achieve 0.784 mean AUC; deployed on HuggingFace Spaces.

HONORS, COMPETITIONS & LEADERSHIP

RARE 26 Challenge (TensorMed): 0.9099 AUROC (95% CI 0.8837–0.9329), 0.4585 AUPRC under extreme 1:19 imbalance (158 positives), GastroNet + SSL DINOv3 (LoRA) with MONAI (**GitHub**).

TÜBİTAK 2209-B funded research: YOLOv8m EV-station anomaly detection (96.7% mAP50) (**GitHub**) | **NeuroBridge Hackathon 2026:** Long COVID MRI + RNA-Seq ensemble (**GitHub**) | **ACUHIT 2026:** ST + TF-IDF + LLM clinical decision support (400k+ 10-yr EHR episodes, Flask/React) (**GitHub**) | **MEDCODES & CYBERMEDU:** Board Member

TECHNICAL SKILLS

Deep Learning & AI: PyTorch, TensorFlow/Keras, Scikit-learn, XGBoost, MONAI, OpenCV, HF Transformers, YOLOv8, Mask R-CNN, Grad-CAM, LDM (SDEdit), CUT, CycleGAN, scMRDR (Cross-Modal VAE), DINOv3, DeepSeek-R1, QLoRA, LODO/OOD Audits, LangChain, Agentic RAG, FAISS.

Computational Biology: PhenoCycler (CODEX), 10x Xenium, CellposeSAM v2, Novae, Harmony, DBSCAN, cKDTree, Zarr, Oxford Nanopore (Flye, ABRicate, BLAST).

Programming & Infrastructure: Python, C, Java, SQL, Bash, Git, Linux, Docker, FastAPI, Flask, React, Three.js, HuggingFace Spaces, Isaac Sim, ESP32/Arduino, Flutter | **English:** C1.