ANTHONY MATAR

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EDUCATION

University of Virginia, School of Arts and Sciences; Charlottesville, VA **May 2025**
B.A., Computer Science with Distinction; 3.91 GPA

- Relevant Coursework: Machine Learning, Natural Language Processing, Artificial Intelligence, Mathematical Statistics, Mathematics for Data Science, Database Systems, Applied Linear Algebra, Probability, Advanced Software Development

PUBLISHED RESEARCH

Matar DY, Mackert GA, **Matar AY**, Chen AC, Panayi AC, Knoedler L, Knoedler S, Yang R, Mady LJ, Kao HK. Artificial intelligence outperforms a nomogram for osteoradionecrosis prognostication following fibula free flap reconstruction in oral cancer patients. J Stomatol Oral Maxillofac Surg. 2025 Oct 1;127(1):102584. doi: 10.1016/j.jormas.2025.102584

Matar DY, Knoedler S, **Matar AY**, Friedrich S, Kiwanuka H, Hamaguchi R, Hamwi CM, Hundeshagen G, Haug V, Kneser U, Ray K, Orgill DP, Panayi AC. Surgical Outcomes and Sociodemographic Disparities Across All Races: An ACS-NSQIP and NHIS Multi-Institutional Analysis of Over 7.5 Million Patients. Ann Surg Open. 2024 Jul 16;5(3):e467. doi: 10.1097/AS9.0000000000000467.

RESEARCH EXPERIENCE

National Institute of Mental Health (NIMH), NIH, Machine Learning Team—Bethesda, MD
IRTA Postbac Research Fellow **(**Advisor: Dr. Francisco Pereira) **|** Aug 2025-Present

- Develop applications of large language models (LLMs) for psychological research and clinical use cases
- Collaborate with senior postdoctoral researchers on machine learning studies spanning clinical and theoretical domains
- Serve concurrently as a ML/data scientist supporting clinical complication prediction research projects

Johns Hopkins Medical School, Division of Plastics—Baltimore, MD
ML Researcher | Dec 2025-Present

- Partner with medical students to retrain and validate osteoradionecrosis (ORN) prediction models following oral tumor excision and fibula free flap reconstruction
- Perform external validation using an independent cohort of 30 patients; support model comparison and reporting for manuscript development

Chang Gung Memorial Hospital, Plastic and Reconstructive Miscosurgery Center—Linkou, Taiwan
ML Researcher | 2024-2025

- Built an end-to-end ML workflow to predict osteoradionecrosis after oral tumor excision and fibula free flap reconstruction
- Led preprocessing, univariate analyses, model training/validation, and feature-importance analyses to predict surgical complications in a ~300-patient cohort

Harvard Medical School and Brigham and Women's Hospital, Division of Plastic Surgery—Boston, MA
Research Data Scientist | 2022-2023

- Cleaned and harmonized large-scale datasets (NSQIP>7.5M records; NHIS >60K records) across hundreds of variables in R
- Summarized pre-, intra-, and postoperative factors plus socioeconomic indicators to evaluate sociodemographic disparities across racial groups
- Additionally created data visualizations for various projects with ggplot2

CURRENT PROJECTS

Risk Prediction for Major Complications After Disease-Directed Breast Surgery: Development and Validation of Interpretable Machine Learning Models

- Developed ML-based risk stratification models for major medical/surgical complications, mortality, unplanned reoperation, and venous thrombosis after disease-directed, non-cosmetic, breast surgery.
- Curated and cleaned > 13M entries to define an analytic cohort of 737,730 NSQIP patients (2008–2024) and derive/validate clinically usable risk groups
- Designed the modeling strategy (including logistic regression, gradient-boosted trees, neural networks, and stacked ensembles) and defined a final risk-binning scheme.
- Built and deployed PRO-Breast, a web app for patient-level risk estimation: (https://pro-breast.streamlit.app/).
- Manuscript under peer review

Last Updated: Jan 25, 2026

Development, Deployment and Validation of an AI-Enhanced Risk Prediction Tool for Postoperative Complications after Tongue Cancer Surgery

- Developed ML models to predict postoperative surgical and aspiration-related complications, unplanned reoperation, and bleeding after glossectomy for tongue cancer.
- Used 8,266 patients from an original cohort of over 13 million in the 2008–2024 NSQIP dataset to create and validate risk strata.
- Led model design and evaluation using logistic regression, gradient-boosted trees, neural networks, SVMs, and stacked ensembles.
- Built and deployed a web interface (PRO-Tongue) for patient-level risk assessment (https://pro-tongue.streamlit.app/).
- Manuscript currently under peer review.

Development and External Validation of Machine Learning Models for Osteoradionecrosis Risk Prediction

- Extended and refined ML models to predict osteoradionecrosis following fibula free flap reconstruction in oral cancer patients.
- Combined study results from an initial Chang Gung Memorial Hospital cohort (274 patients) with an external validation cohort from Johns Hopkins Hospital (31 patients).
- Redesigned and compared multiple model families (gradient-boosted trees, k-nearest neighbors, SVMs, neural networks, stacked ensembles, logistic regression) and updated the risk-stratification framework (very low/low/medium/high).
- Ongoing manuscript preparation.

WORK EXPERIENCE

Software Engineer Intern, Iridium Business Solutions
Cape Town, South Africa | Summer 2023

- Worked with team of 4 interns to design and deploy an HR analytics dashboard to an existing web application
- Utilized AWS Lambda & SAM to initialize 6 months of data, calculating metrics stored in DynamoDB with ReactJS
- Constructed ReactJS trigger functions to perform scheduled tasks & real-time metric updates on dashboard

Pest Control Technician, Matar Group LLC
Alexandria, VA | Summer 2024

- Registered pest control technician in the Commonwealth of Virginia
- Collaborated with other technicians to develop and carry out treatments for residential and commercial properties
- Fostered trust with clients by attentively listening to concerns and delivering quality service

TECHNICAL SKILLS

Programming Languages:	Python, R, SQL, Bash/Shell Scripting
Core ML & Deep Learning Frameworks:	Scikit-Learn, PyTorch, Optuna, Keras, Tensorflow, Pandas, NumPy, Matplotlib
Developer Tools:	GitHub, Streamlit, Tableau, Bootstrap, AWS, Heroku, Firebase
ML Techniques & Methodologies:	Supervised learning, ensembles & stacking, deep learning, model interpretability/explainability, hyperparameter optimization