Joshua J. Whiteley

(314) 293-3333 | joshwhiteley89@gmail.com | linkedin.com/in/joshuawhiteley

Education

Tufts University — Boston, MA
PhD Candidate in Biomedical Engineering — *Aug. 2022 – Fall 2026*

Tufts University — Boston, MA
Master of Science in Biomedical Engineering — *Aug. 2021 – Aug. 2022*

University of Illinois at Urbana-Champaign — Champaign, IL
Bachelor of Science in Bioengineering — *Aug. 2017 – May 2021*

Experience

Graduate Research Assistant — Boston, MA
Tufts University — Aldridge Lab — *Aug. 2021 – Present*

- Built a translational modeling pipeline linking imaging-derived biomarkers and in vitro readouts to longitudinal outcomes; calibrated and validated sequential models to predict intermediate and terminal endpoints ($R^2 > 0.80$ across held-out CV).
- Developed multimodal models integrating morphological profiling + RNA-seq to generate mechanism-linked hypotheses; partnered with domain experts to interpret latent factors and prioritize follow-up experiments. Probed mechanism of action in novel anti-tubercular drugs.
- Delivered decision-ready candidate prioritization from large search spaces by combining calibration, confidence scoring, and reproducible evaluation; produced ranked shortlists used to guide *in vivo* experimental follow-up.
- Developed and deployed an end-to-end microscopy to cell morphology pipeline (Python, Bash, SLURM, ilastik, U-Net) that ingests raw microscope images, runs parallelized segmentation/feature extraction, and outputs per-cell morphological profiles; used to generate over 50 TB in imaging data. Developed a Web app to validate segmentation performance and generate a ground-truth dataset for further Reinforcement Learning.

Teaching Assistant — Boston, MA
Tufts University - BME143: Biological Systems Analysis — *Aug. 2022 – Present*

- Lectured, designed and graded assignments/exams, and held weekly office hours for a graduate course on biological systems modeling and analysis.
- Taught and mentored graduate students in ODE-based biological systems modeling (stability, identifiability concepts, parameter fitting), strengthening ability to explain mechanistic models clearly to mixed audiences.

Organizing Committee Member — Boston, MA
Boston Bacterial Meeting — *Jan. 2025 – Present*

- Planned and coordinated the conference program and logistics for 500+ attendees for BBM2025 and BBM2026.

Undergraduate Research Assistant — Urbana, IL
Cancer Center at Illinois - Bhargava Lab — *Feb. 2018 – Mar. 2020*

Publications

- **INFORM: Infrared-based tumor microenvironment features predict survival**. *Science Advances* (2021). DOI: 10.1126/sciadv.abb8292
- **Integration of multimodal measurements identifies mechanisms of TB drug action**. *Cell Systems* (2025). DOI: 10.1016/j.cels.2025.101348
- **Lesion-specific outcome prediction in TB: sequential RF on PET/CT & in vitro correlates**. *Manuscript in preparation. First author.* (2025).

Technical Skills

Programming: Python, R, MATLAB, SQL (SQLite, PostgreSQL), Bash — *Familiar:* Java, JavaScript
ML/DS: *Core ML* (scikit-learn, XGBoost, PyTorch, TensorFlow); *Evaluation/Explanation* (calibration, SHAP); *Data* (pandas, NumPy); *Visualization* (Matplotlib, Seaborn, ggplot2)
Data & Tools: *Backend* (Flask/REST), *Data layer* (SQLAlchemy), *Tracking* (W&B), *Version control* (Docker, Git), *HPC/OS* (Linux/SLURM), *Interop* (ONNX)