

# Maxwell Qiu

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## Education

**Concordia University, Montreal, QC** Sep 2022 – Aug 2025

Bachelor of Arts, Joint Major in Data Science

- **Courses:** Computer Vision, Neural Networks, Data Structures, Algorithms, AI and ML, Data Science Lab, Big Data Analytics

## Publications

**Lightweight U-Net for Breast Ultrasound Image Segmentation** Aug 2025

**Wenyang Qiu**, Ethan Hamburg, Yinkun Zhou, Yaser Esmaeili Salehani

Department of Computer Science and Software Engineering, Concordia University, 2025.

**Prediction of patient breast cancer probability** Mar 2024

**Wenyang Qiu**

*Applied and Computational Engineering* 47(1):207–212

## Work Experience

**Machine Learning Engineer**, Salehanil Lab @Concordia, Montreal, QC May 2025 – Present

- Spearheaded the integration of Squeeze-and-Excitation (SE) attention blocks into a lightweight U-Net for medical image segmentation, reducing false positives by 2% and enhancing early breast cancer diagnosis.
- Preprocessed the **BUS-BRA** dataset at 2000 files with **Python** and **Albumentations**, containerized the ETL in **Docker** to ensure reproducible, portable data pipelines.
- Trained and evaluated models with controlled hyperparameter tuning and LR scheduling, containerized in **Docker** and executed as **Kubernetes** Jobs (resource requests/limits) for parallel, reproducible runs.
- Reduced model complexity to **3.10M** parameters and **0.72 GFLOPs**, enabling efficient, near real-time inference.
- Implemented a hybrid loss (**Binary Cross-Entropy + Dice**) in **PyTorch** to improve optimization stability and segmentation accuracy by 15%.
- Achieved **88.88% Dice** and **81.26% mIoU**, outperforming **U-Net**, **Attention U-Net**, and **SSL** baselines; visualized qualitative masks and quantitative metrics across runs.

**Data Scientist**, Vogelsberger Lab @MIT, Remote Jul 2023 – Sep 2023

- Built insight-driven visuals for a **100,000**-population **WHO** breast cancer dataset using **Matplotlib** and **Seaborn**, highlighting trend shifts and outliers for stakeholders.
- Applied **scikit-learn** across 5 datasets (**SVR**, polynomial regression, shallow NN) to benchmark forecasting baselines with cross-validated results.
- Pioneered **A/B testing** frameworks for data visualization, employing statistical methods using SciPy to identify factors associated with user drop-offs, and increased user engagement by 12%.
- Architected a lightweight **data lake** (raw/curated/feature zones) with partitioned **Parquet**, schema/version control, and quality checks; explored **NoSQL** for scalable ingestion and querying.
- Packaged models as an internal **Flask/FastAPI** service to enable rapid **data science product deployment** and reproducible results.

**Software Developer**, Unity Technologies, Montreal, QC May 2022 – Feb 2023

- Developed predictive **risk models** in **Python** (feature signals from logs/defects) to flag high-risk features pre-release, achieving a 42% reduction in critical bugs and improved product stability scores.
- Engineered scalable data extraction pipelines in **Python** (pandas/NumPy) to parse Unity test logs and store in **MySQL** database, quantifying bug-density and severity distributions by module; enabled risk-based validation and test prioritization.
- Automated Unity Editor cross-platform testing workflows on **Windows/macOS/Linux** using **C#** with **GameDriver**, ensuring consistent validation of user interactions and editor tooling.
- Implemented modular test frameworks utilizing the **PageObject** pattern in **C#/Python**, leading to 60% improved code reusability and a 45% reduction in deployment cycle times.
- Built Unity **C# validation hooks** and **Python batch validators** with **MLP** and **XGBoost** to classify AI behaviors (pathfinding, NPC), enforcing data-quality standards and reducing low-quality submissions by 56%.

**Senior QA Developer**, Autodesk, Montreal, QC Feb 2021 – April 2022

- Automated end-to-end testing pipelines in **JavaScript** using **Cypress** with **TestRail** integration, capturing functional health metrics across releases and enabling CI-integrated QA workflows with full audit trails and version control.
- Resolved user-reported issues via Slack and embedded **JavaScript** validation workflows.
- Leveraged **JavaScript**-driven TestRail analytics to identify defect hotspots and prioritize test coverage, contributing to improved release stability and fewer post-deployment incidents.

## Technical Skills

- **Languages:** Java, Python, C#, JavaScript, C++, SQL, HTML/CSS, Bash
- **Tools:** *Data*: pandas, NumPy, Spark, Hadoop; *ML*: scikit-learn (Pipelines, GridSearchCV), XGBoost; *DL/CV*: PyTorch, Albumentations, OpenCV; *Segmentation*: U-Net, Attention U-Net, MobileNetV2 encoder, SE Attention; *Visualization*: Matplotlib, Seaborn; *Algorithms*: Random Forest, SVM, Decision Trees, k-means; *Losses*: BCE + Dice; *Metrics*: Dice, mIoU