Atharva Bhagwat

atharva.bhagwat42@gmail.com | atharva-bhagwat | atharva-bhagwat.github.io

Education

- **New York University** *Sept 2021 – May 2023*
  MS in Computer Science (GPA: 3.63/4.0) New York, USA
- **Pune Institute of Computer Technology** *Aug 2016 – April 2020*
  BE in Computer Engineering (GPA: 8.45/10) (U.S. equivalent: 3.6/4.0, course-by-course evaluation) Pune, India

Experience

- **Tsankov Lab, Icahn School of Medicine at Mount Sinai** *Jan 2023 – Present*
  Associate Researcher New York, USA
  - Led computational analyses of lung senescence using Xenium spatial transcriptomics data, developing an end-to-end preprocessing pipeline for quality control, spatial gene expression trends, and cell type proportion analysis (Scanpy, Squidpy)
  - Designed workflows for cell-cell communication analysis and *de novo* spatial niche detection with stLearn and SOAPy to uncover multicellular organization patterns
  - Automated large-scale data processing and hypothesis testing on HPC clusters using job-array based parallelization
  - Contributed analyses to multiple manuscripts integrating spatial and single-cell insights into biological discovery
- **Tsankov Lab, Icahn School of Medicine at Mount Sinai** *May 2022 – Aug 2022*
  Associate Researcher New York, USA
  - Implemented ML models to predict driver mutations in lung adenocarcinoma (LUAD) by integrating clinical and transcriptomic features
  - Processed genomic datasets in BAM, VCF formats using the Genome Analysis Toolkit (GATK) to extract variant- and expression-derived features for model training
  - Performed XGBoost based feature importance analyses to evaluate the contribution of clinical data to mutation prediction
- **ResoluteAI.in** *July 2020 – May 2021*
  Machine Learning Engineer Bangalore, India
  - Developed an ML-based automation system for textile yield monitoring and anomaly detection, doubling operational efficiency and achieving 99% detection accuracy
  - Built a YOLOv4-based pipeline with stacked ML models for automated data annotation and predictive analysis
  - Designed a scalable MySQL database enabling efficient data tracking and visualization across production lines
  - Delivered and presented multiple proof-of-concept systems (e.g., ID validation, attendance tracking) for clients, showcasing rapid prototyping and deployment of scalable ML solutions

Publications

* Contributed equally

1. Ke Xu*, Grace S. Kim*, **Atharva Bhagwat***, et al. **Human Cellular Clock of the Aging Lung Parenchyma.** In revision at *Cell Press*.
2. William Zhao*, Thinh T. Nguyen*, **Atharva Bhagwat***, Akhil Kumar*, Bruno Giotti*, et al. (2025). **A cellular and spatial atlas of TP53-associated tissue remodeling defines a multicellular tumor ecosystem in lung adenocarcinoma.** *Nature Cancer*. PMID: 41057692
3. Viral S. Shah*, Avinash Waghray*, Brian Lin*, **Atharva Bhagwat***, Isha Monga*, Michal Slyper*, Bruno Giotti*, et al. (2025). **Single cell profiling of human airway identifies tuft-ionocyte progenitor cells displaying cytokine-dependent differentiation bias in vitro.** *Nature Communications*. PMID: 40467553
4. Bruno Giotti*, Komal Dolasia*, William Zhao*, Peiwen Cai*, . . . , **Atharva Bhagwat**, et al. (2024). **Single-Cell View of Tumor Microenvironment Gradients in Pleural Mesothelioma.** *Cancer Discovery*. PMID: 38959428

Posters & Presentations

* Contributed equally

- **Human Cellular Clock of the Aging Lung Parenchyma**
  Ke Xu, Grace S. Kim*, **Atharva Bhagwat***, et al.*
  - NIH Common Fund Cellular Senescence Network (SenNet) Fall Meeting 2025
  - Genetics and Genomic Sciences department retreat 2025
  - 89th Cold Spring Harbor Laboratory Symposium on Quantitative Biology: Senescence & Aging 2025
  - Festival of Genomics and BioData Boston 2025

Projects

- **Separating Perception and Reasoning via Relation Networks** *(Class Project) Sept 2022 – Dec 2022*
  Tools: Python, PyTorch, Git [🌐]
  - Implemented a Relation Network (RN) architecture for visual question answering (VQA) to separate perception (CNN feature extraction) from relational reasoning
  - Designed and trained pixel-based and state-description RN architectures on the Sort-of-CLEVR dataset, achieving 91% accuracy on relational and >99% on non-relational tasks
  - Evaluated model performance and reasoning accuracy across relational and non-relational visual tasks
- **Unsupervised Video Summarization via Attention-Driven Adversarial Learning** *(BE Final-Year Project) 2019 – 2020*
  Tools: Python, PyTorch, Git
  - Implemented an unsupervised video summarization framework using an attention-based generative adversarial model to identify key video segments without labels
  - Implemented a shot-boundary detection module for temporal segmentation of videos based on visual similarity and scene changes
  - Trained and evaluated models on benchmark datasets (TVSum, SumMe) to generate concise and meaningful video summaries
- **Visualization of Convolutional Neural Networks (CNNs) and Effects of Adversarial Attacks** *(Seminar Course) 2018*
  Tools: Python, TensorFlow, Git
  - Explored techniques to visualize internal feature maps of convolutional neural networks to interpret model's decision-making
  - Demonstrated how small, imperceptible adversarial perturbations can cause misclassification in deep learning models
  - Studied existing defense strategies such as adversarial training and input reconstruction to improve model robustness
  - Presented findings in a seminar on explainability and robustness in deep learning

Skills

- **Programming:** Python, R, SQL, PyTorch, TensorFlow
- **Cloud & Data Management:** Globus, Google Cloud Platform (GCP), AWS
- **Version Control:** Git, Docker

Scholarships and Awards

- **Winner – Susan G. Komen Breast Cancer Hackathon 2023** *April 2023*
  Susan G. Komen Foundation
- **Academic Scholarship** *2021 – 2023*
  New York University

Volunteer Experience

- **STEM Research Mentor** *Oct 2024 – May 2025*
  Roaring Cubs Collective
  - Mentored high school students on independent research projects in AI and computational biology