

ASHLEY TSANG

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EDUCATION

University of Michigan , Ann Arbor, MI	(anticipated) May 2028
– Ph.D. Candidate in Bioinformatics	
Johns Hopkins University , Baltimore, MD	May 2023
– M.S.E., Biomedical Engineering	May 2022
– B.S., Biomedical Engineering and Computer Science	

PUBLICATIONS

- [8] Encoding functional edges in graphs to model spatially varying relationships in the tumor microenvironment
Tsang A*, Krishnan S*, Kulkarni R, Bhadury S, di Maglano M, Frankel T, Rao A
Under revision at npj Artificial Intelligence, 2025.
(*equal contribution)
- [7] A phase 2 multicenter trial of rucaparib and nivolumab as maintenance therapy in patients with advanced biliary tract cancer: BilT-02
Mohan A, Griffith K, Goff L, Crysler O, Enzler T, Cardin D, Gunchick V, **Tsang A**, ..., Sahai V
Accepted to Clinical Cancer Research, 2025.
- [6] Mapping the Tumor Microenvironment with Integrative Single-Cell RNA Sequencing and Spatial Proteomics: Uncovering Mechanisms of Disease and Therapeutic Resistance
Tsang A, Elhossiny A, Di Maglano M, Rao A
Book chapter in Cellular Spatial Characterization and Analysis. Springer (in press).
- [5] Assessing the tumor immune landscape across multiple spatial scales to differentiate immunotherapy response in metastatic non-small cell lung cancer
Tsang A*, Krishnan S*, Eliason J*, McGue J, Qin A, Frankel T, Rao A
Laboratory Investigation, 2024.
(*equal contribution)
- [4] Inferring cellular and molecular processes in single-cell data with non-negative matrix factorization using Python, R, and GenePattern Notebook implementations of CoGAPS
Johnson J*, **Tsang A**, ..., Fertig E, Stein-O'Brien G
Nature Protocols, 2023.
(*equal contribution)
- [3] Deep Learning Model for Static Ocular Torsion Detection Using Synthetically Generated Fundus Images
Wang C, Bai Y, **Tsang A**, ..., Greenstein J
Translational Vision Science and Technology, 2022.
- [2] Biopsy Needle Accessory
Liddell R, Weidman D, **Tsang A**, ..., Matin S
PCT US2022/077146, 2022. Patent-pending.
- [1] Adequacy of samples obtained via percutaneous core-needle rebiopsy for EGFR T790M molecular analysis in patients with non-small cell lung cancer following acquired resistance to first-line therapy: A systematic review and meta-analysis
Poudel B, Desman J, Aihara G, Weidman D, **Tsang A**, ..., Liddell R
Cancer Treatment and Research Communications, 2021.

RESEARCH EXPERIENCE

- Systems Imaging & Bioinformatics Lab @ UM**, Graduate Researcher 2023–Present
- Developed method integrating graph neural networks and spatial statistics to model tumor microenvironment interactions, uncovering drivers of cancer subtypes and progression.
 - Collaborate with clinicians and researchers across universities to develop and apply computational methods for analyzing multi-modal cancer patient cohorts.
 - One of 18 teams selected internationally to participate in *Owkin & Servier AI Hackathon for Glioblastoma Research*; finalist for developing a graph-based approach to predict cancer signatures from multi-modal data.

- Wirtz/Wu Lab @ JHU**, Graduate Researcher 2022–2023

- Ideated a multi-stage deep learning architecture for histopathology, enabling quantification of immune infiltration with limited annotations.
- Led collaborations with JHU research groups to apply method to study ovarian cancer and melanoma.

- Fertig Lab & Stein-O'Brien Lab @ JHU**, Undergraduate/Graduate Research Assistant 2021–2023

- Developed an open-source Python package to infer biological processes from single-cell RNA-seq data; led to co-first author publication in *Nature Protocols*.
- Improved runtime efficiency by 65%, on the scale of tens of hours, for large datasets compared to original R/C++ implementation.
- Implemented package and protocol in an interactive interface and Dockerized environment, broadening usability and adoption among researchers.

- Malone Center for Engineering in Healthcare @ JHU**, Undergraduate Research Assistant 2019–2020

- Created a user-friendly programming interface for efficient video frame annotation in cataract surgery procedures, facilitating downstream computer vision and object tracking research.
- Implemented traditional computer vision techniques to perform object tracking across frames.

PROFESSIONAL EXPERIENCE

- PneuTech LLC**, Co-Founder 2019–2024

- Designed a novel medical device to improve lung biopsy procedures; U.S. patent pending.
- Awarded the Innovators of Progress Scholarship (1 of 3 recipients in DMV area); finalist in 5 startup competitions (1st place, 2 runner-up), completed 3 accelerator programs, and presented at medical device conference; secured \$65K+ in funding.

- Department of Applied Mathematics and Statistics @ JHU**, Teaching Assistant 2020

- Planned and taught weekly Discrete Mathematics discussion sections, held office hours, and graded work.

- FibroGen, Inc.**, Quality Control Summer Intern 2016 & 2017

- Managed and organized reports from quality testing procedures and observed workflows in multiple departments, gaining insight into pharmaceutical development processes.

AWARDS & HONORS

- NIH Predoctoral T32 Fellowship in Biomedical Informatics and Data Science 2023–2025
- JHU General Honors & Departmental Honors in Biomedical Engineering & Computer Science 2022
- VentureWell E-Team Entrepreneurship Award 2022

SKILLS

- **Programming:** Python, R, MATLAB, Java, C/C++
- **Libraries:** PyTorch, PyTorch Geometric
- **Multi-modal data analysis:** H&E, spatial transcriptomics (Xenium & Visium), spatial proteomics (multiplexed immunfluorescence & CODEX), scRNA-seq, CyTOF