# Kamal Maher

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github.com/kmaherx

## Education

**MIT**
*Doctor of Philosophy* August 2020 - Present
Computational and Systems Biology Program
Advisor: Xiao Wang

**Cornell University**
*Bachelor of Science* August 2014 - May 2018
Major: Neuroscience

## Experience

**Broad Institute/MIT** August 2021 - Present
*Graduate Researcher*
Xiao Wang Lab
- Biologically and quantitatively principled representations of tissues at the single-cell level.

**Genentech** June 2024 - September 2024
*Summer Intern*
Aviv Regev Lab
- Graph signal processing to identify multicellular regions and intercellular interactions in spatial transcriptomics data.

**MIT** May 2018 - May 2020
*Research Assistant*
Steven Flavell Lab
- Optogenetics, image processing, and quantitative modeling to characterize neuronal activity in *C. elegans*.

**Cornell University** May 2015 - May 2018
*Undergraduate Researcher*
Jesse Goldberg Lab
- Electrophysiology and fluorescent imaging to map neural circuitry in zebra finches and mice.

## Selected papers

**Maher, K.** & Wang, X. *Harmonic representations of regions and interactions in spatial transcriptomics.* bioRxiv (2024) doi:10.1101/2024.08.14.607982. [Link]

**Maher, K.**, Wu, M., Zhou, Y., Huang, J., Zhang, Q. & Wang, X. *Mitigating autocorrelation during spatially resolved transcriptomics data analysis.* In revision, Cell Systems. bioRxiv (2023) doi:10.1101/2023.06.30.547258. [Link]

*Shi, H., *He, Y., *Zhou Y., Huang, J., **Maher, K.**, Wang, B., Tang, Z., Luo, S., Tan, P., Wu, M., Lin, Z., Ren, J., Thapa, Y., Tang, X., Chan, K. Y., Deverman, B. E., Shen, H., Liu, A., Liu, J. & Wang, X. *Spatial atlas of the mouse central nervous system at molecular resolution.* Nature (2023) doi:10.1038/s41586-023-06569-5. [Link] (*co-first author)

**Skills**

*Graphs:* Spectral graph theory, graph signal processing, graph neural networks
*Python:* Scientific (numpy, scipy, sklearn, pandas), Single-cell (scanpy), ML (pytorch), Packaging (flit, .toml)
*Command line:* Shell scripting, cluster computing (UGE, SLURM)

**Talks**

- Single-Cell Genomics Gordon Research Conference (Invited) 2024
- Single Cell Genomics Day (Invited) 2024
- Cells, Circuits & Epigenomics, Broad Institute 2023
- Spatial Interest Group, Broad Institute 2022

**Teaching**

*MIT Quantitative Biology Workshop* 2025
- Designed an undergraduate seminar introducing spatial omics analysis from a signal processing perspective.

*MIT Quantitative Biology Workshop* 2024
- Designed an undergraduate seminar introducing spatial omics analysis from a signal processing perspective.

*MIT 7.016 Introductory Biology* 2022
- Led discussion sections and grading for an accelerated introductory biology course.

*Cornell Life Sciences Tutor* 2017 - 2018
- Provided individualized tutoring in physics and organic chemistry to other undergraduates.

**Mentorship**

*Broad Institute/MIT*
Undergraduate students: Brandon Wang
Associate computational biologists: Morgan Wu
Graduate students: Seth Furniss, Bridget Li, Danielle Firer

**Outreach**

*ABRCMS Exhibitor* 2024
- Tabled for MIT Computational and Systems Biology, providing information to undergraduate attendees and answering application questions.

*ABRCMS Exhibitor* 2023
- Tabled for MIT Computational and Systems Biology, providing information to undergraduate attendees and answering application questions.

*CSB Application Assistance Program* 2022
- Served as a point of contact for Computational and Systems Biology applicants, helping navigate the process and providing individualized feedback.