Maxwell A. Xu

5100 Riverlake Drive, Peachtree Corners, GA 30097
maxxu05@gmail.com | (404) 405-1266

EDUCATION

Georgia Institute of Technology
Presidential Fellow
August 2020 – Current

PhD in Machine Learning

Johns Hopkins University
Dec 2019
All Semesters Dean's List
GPA: 3.84 / 4.00

B.S. in Applied Mathematics & Statistics
B.S. in Biomedical Engineering

SKILLS

Programming: Python, R, Java, SQL, C, Linux, MATLAB, HTML, CSS, Git

Machine Learning: Deep Learning, Time Series Analysis, Imputation, Data Visualizations, Computer Vision

Clearance: United States Top Secret

Languages: English, Chinese, Spanish

Affiliations: Tau Beta Pi Engineering Honor Society, Alpha Phi Omega Volunteering Fraternity, JHU Blue Jays Ice Hockey

EXPERIENCE

Rehg Lab at the Georgia Institute of Technology — *Atlanta, GA*
Graduate Research Assistant — *Aug 2020 – Current*

- Developing deep probabilistic neural network imputation models for mobile health biomarker detection
- Research interests are in temporal machine learning methods and computer vision

Systems & Technology Research — *Boston, MA*
Machine Learning Researcher — *Jan 2020 – Aug 2020*

- Spearheaded machine learning initiatives within the cybersecurity vulnerability research
- Created a reinforcement learning method for greybox mutation-based fuzzer
- Developed a seq2seq VQ-VAE WaveRNN decoder for unsupervised representation learning of audio

Medtronic plc — *New Haven, CT*
AI/Data Science Engineer Contractor — *May 2019 – Dec 2019*

- Developed a tool to predict lung cancer recurrence from clinical big data using machine learning
- Created a computer vision blob detection tool
- Utilized survival analysis with Kaplan-Meier curve visualizations to identify cancer recurrence risk factors

Johns Hopkins University Department of Computer Science — *Baltimore, MD*
Data Structures Teaching Assistant — *Jan 2019 – Dec 2019*

- Collaborated with team of faculty during weekly meetings and actively contributed to course content
- Worked with students to enhance student understanding of content such as heaps, AVL trees, hashmaps

BioSwift Biomedical Engineering Design Team — *Baltimore, MD*
Former Chief Executive Officer and Co-Founder — *Aug 2018 – Dec 2019*

- Won 1st place in the 2019 ASAIOfyi Student Design Competition, 1st place at Fall 2019 Johns Hopkins FastForward U Spark Accelerator Competition, 3rd place at 2019 Johns Hopkins BPC
- Secured over $10,000 in funding, including from the Johns Hopkins Student Initiatives Fund
- Press release:
  - https://ventures.jhu.edu/news/bioswift-aquatas-fast-forward-u-accelerator-demo-days/
  - https://www.jhunewsletter.com/article/2019/11/fastforward-u-teams-innovate-with-new-and-old-technologies
  - https://www.facebook.com/JohnsHopkinsBME/photos/a.131397713949264/692413781180985/?type=3&theater

Sengupta-Krummel Lab at the Emory Winship Cancer Institute — *Atlanta, GA*
Cancer Genomics Bioinformatics Researcher — *May 2017 – Dec 2019*

- Employed hierarchical clustering techniques for analysis of gene expression data
- Counted reads of mapped bam files with featureCounts to obtain RNA-seq data
- Used DESeq2 method to identify differentially expressed genes followed by pathway analysis
- Conducted survival analysis with the Kaplan-Meier estimator and Cox PH Regression Model

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Johns Hopkins University Department of Applied Mathematics and Statistics *Baltimore, MD*
Probability and Statistics Teaching Assistant *Jan 2019 – May 2019*

- Nominated for Spring 2019 Teaching Award for demonstrating an extraordinary commitment to pedagogy

Johns Hopkins University PILOT Learning Program *Baltimore, MD*
Head PILOT Leader of Organic Chemistry *Aug 2017 – May 2019*

- Gave lectures to enhance student understanding of content
- Directed other PILOT leaders in their roles to teach students
- Developed problem sets to be distributed among the entire program

Centers for Disease Control and Prevention *Atlanta, GA*
Outbreak Surveillance Biostatistics Intern *May 2018 – Aug 2018*

- Spearheaded a new initiative within the Cluster Detection Working Group to utilize whole genome multilocus sequence typing data to detect disease clusters
- Employed machine learning techniques to develop this disease cluster detection method for *Listeria monocytogenes* while utilizing the cluster, dplyr, tidyr, igraph, lubridate, and inflection packages
- Validated identified clusters with Simpson's Index of Diversity with PulseNet cluster codes and Chi-Squared ranked overlap between multi-dimensional independent hierarchical clustering

Johns Hopkins Popel Systems Biology Lab *Baltimore, MD*
Assistant Researcher *Sept 2017 – Aug 2018*

- Modeled the PD-L1 pathway in a tumor microenvironment with the Simbiology tool within MATLAB
- Utilized a particle swarm algorithm to optimize the model's fit

Georgia Tech Biomedical Informatics and Bio-imaging Lab *Atlanta, GA*
Assistant Researcher *Aug 2015 – May 2016*

- Conducted k-means machine learning methods on 3-D IMS-MALDI data

PERSONAL PROJECTS

Modeling A Transferable Histopathological Image Analysis System *Dec 2019*

- Won Intuitive Surgical Best Project Award ($800 cash prize) out of ~40 total submissions
- Developed a novel unsupervised representation learning method for histopathology images by leveraging the deep clustering technique
- Press Release:
  - https://malonecenter.jhu.edu/2020/01/27/deep-learning-course-prepares-students-for-success-in-ai-careers/

PUBLICATIONS

Pomeranz Krummel, D.‡, Nasti, T.‡, Izar, B.†, Press, R.†, **Xu, M.**†, Lowder, L., Kaluzova, M., Kallay, L., Rupji, M., Rosen, H., Su, J., Curran, W., Olson, J., Weinberg, B., Schniederjan, M., Neill, S., Lawson, D., Kowalski, J., Khan, M., Sengupta, S. Impact of sequencing radiation therapy and immune checkpoint inhibitors in the treatment of melanoma brain metastases. Radiation Oncology. 2020. (‡Co-first authors; †Co-second authors) DOI: https://doi.org/10.1016/j.ijrobp.2020.01.043

Pomeranz Krummel, D.‡, Nasti, T.‡, Izar, B.†, **Xu, M.**†, Lowder, L., Press, R., Kaluzova, M., Kallay, L., Rupji, M., Burnham, A., Li, G., Ahmed, T., Rosen, H., Keskin, H., Thomas, M., Connolly, E., Chen, H-R., Curran, W., Kudchadkar, R., Weinberg, B., Olson, J., Schniederjan, M., Neill, S., Su, J., Lawson, D., Cook, J., Jenkins, A., Kowalski, J., Khan, M., Sengupta, S. Melanoma cell intrinsic GABAA receptor enhancement potentiates radiation and immune checkpoint inhibitor response by promoting direct and T cell-mediated anti-tumor activity. In Review, 08/2020. (‡Co-first authors; †Co-second authors)

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Kallay, L., Keskin, H., Ross, A., Rupji, M., Moody, O., Wang, X., Li, G., Ahmed, T., Rashid, F., Rajesh Stephen, M., Cottrill, K., Nuckols, T., **Xu, M.**, Martinson, D., Tranghese, F., Pei, Y., Cook, J., Kowalski, J., Taylor, M., Jenkins, A., Pomeranz Krummel, D., Sengupta, S. Modulating native GABAA receptors in medulloblastoma with positive allosteric benzodiazepine-derivatives induces cell death. Journal of Neuro-Oncology. 2019; 142(3):411-422. doi: 10.1007/s11060-019-03115-0.

PUBLISHED CONFERENCE ABSTRACTS

Pomeranz Krummel, D.‡, Tahseen, N.‡, Izar, B.†, **Xu, M.**†, Lowder, L., Press, R., Rupji, M., Kaluzova, M., Kallay, L., Burnham, A., Li, G., Ahmed, T., Chen, H., Curran, W., Kudchadkar, R., Olson, J., Schniederjan, M., Neill, S., Lawson, D., Cook, J., Weinberg, B., Jenkins, A., Kowalski, J., Khan, M., Sengupta, S. EXTH-12. Radiation enhances melanoma response to immunotherapy and synergizes with benzodiazepines to promote anti-tumor activity. Neuro-Oncology, 21(Supplement 6), November 2019, Page vi84, https://doi.org/10.1093/neuonc/noz175.346 (‡Co-first authors; †Co-second authors)

Kaluzova, M., Nasti, T., Chen, H-R., Lowder, L., Press, R., Rosen, H., Rupji, M., Kallay, L., Patel, R., Burnham, A., **Xu, M.**, Ross, A., Keskin, H., Connelly, E., Izar, B., Adamson, C., Olson, J., Su, J., Curran, W., Kudchadkar, R., Schniederjan, M., Neill, S., Lawson, D., Chan, M., Kowalski, J., Khan, M., Pomeranz Krummel, D., Sengupta, S. Abstract 247: Identification of the GABAA receptor in melanoma brain metastases patient tumors and demonstration that it is a viable drug target using benzodiazepine-derivatives. In: Proceedings of the American Association for Cancer Research Annual Meeting 2019; 2019 Mar 29-Apr 3; Atlanta, GA. Philadelphia (PA): AACR; Cancer Res 2019;79(13 Suppl). https://doi.org/10.1158/1538-7445.AM2019-247

Kallay, L., Keskin, H., Ross, A., Rupji, M., Moody, O., Wang, X., Li, G., Ahmed, T., Rashid, F., Rajesh Stephen, M., Cottrill, K., N`uckols, A., **Xu, M.**, Martinson, D., Tranghese, F., Pei, Y., Cook, J., Kowalski, J., Taylor, M., Jenkins, A., Pomeranz Krummel, D., Sengupta, S. Abstract 2623: Modulating native GABAA receptors in medulloblastoma with positive allosteric benzodiazepine-derivatives induces cell death. Proceedings of the American Association for Cancer Research Annual Meeting 2019; 2019 Mar 29-Apr 3; Atlanta, GA. Philadelphia (PA): AACR; Cancer Res 2019;79(13 Suppl). https://doi.org/10.1158/1538-7445.AM2019-2623

Kowalski, J., Pomeranz Krummel, D., Rupji, M., Dwivedi, B., Keskin, H., Kallay, K., **Xu, M.**, Ross, A., Press, R., Rosen, H., Connelly, E., Patel, R., Izar, B., Adamson, C., Olson, J., Su, J., Kudchadkar, R., Schniederjan, M., Lowder, L., Neill, S., Curran, W., Lawson, D., Chan, M., Khan, M., Sengupta, S. COMP-22: Large scale transcriptomic analysis of melanoma brain metastases, Neuro-Oncology, Volume 20, Issue suppl_6, 1 November 2018, Page vi68, https://doi.org/10.1093/neuonc/noy148.277

Kowalski, J., Pomeranz Krummel, D., Rupji, M., Dwivedi, B., Keskin, H., Kallay, K., **Xu, M.**, Ross, A., Press, R., Rosen, H., Connelly, E., Patel, R., Izar, B., Adamson, C., Olson, J., Su, J., Kudchadkar, R., Schniederjan, M., Lowder, L., Neill, S., Curran, W., Lawson, D., Chan, M., Khan, M., Sengupta, S. CD131: Large scale transcriptomic analysis of melanoma brain metastases. Annals of Neurology 84(suppl 22), 2018.

Kallay, L., Keskin, H., Ross, A., Moody, O., Cottrill, K., Nuckols, A., Li, G., Ahmed, T., Rashid, F., Rajesh Stephen, M., **Xu, M.**, Martinson, D., Macdonald, T., Kowalski, J., Wang, X., Taylor, M., Cook, J., Jenkins, A., Pomeranz Krummel, D., Sengupta, S. PDTM-45: Positive modulation of native gabaa receptors in medulloblastoma cancer cells with benzodiazepines induces rapid mitochondrial fragmentation and tp53-dependent, cell cycle-independent apoptosis. Neuro-Oncology, Volume 20, Issue suppl_6, 1 November 2018, Page vi213, https://doi.org/10.1093/neuonc/noy148.884

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CONFERENCE POSTER PRESENTATIONS

Xu, M.‡, Arpornsuksant, P.‡, Bai, Y.‡, Egyen-Davis, D.‡, Kedia, V.‡, Lee, C.‡, Pitaktong, I.‡, Zhu, L.‡, Ali, S., Manbachi, A., Lee, C., Jassal, M. Design and Validation of a Dry Powder Inhaler Adaptor to Enhance Delivery of Asthma Medication. Biomedical Engineering Society Annual Meeting 2019; 2019 Oct 16-19; Philadelphia, PA. (‡Co-first authors)

Xu, M., Gilbert-Honick, J., Grayson, W. The Effect of a Fibrin Hydrogel on C2C12 Myogenesis and Acetylcholine Receptor Clustering. 3rd Annual Institute for Nanobiotechology Undergraduate Research Symposium 2017; 2017 Nov 6; Baltimore, MD.