

Maxwell A. Xu

Atlanta, GA
mxu87@gatech.edu | maxxu05.github.io

EDUCATION

Georgia Institute of Technology Presidential Fellow

2020 – Current
GPA: 4.00 / 4.00

PhD in Machine Learning
M.S. in Computer Science

Johns Hopkins University

Grad 2019
GPA: 3.84 / 4.00

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

SKILLS

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

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

Clearance: United States Top Secret

Languages: English, Chinese

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

Graduate Research Assistant

Atlanta, GA
Aug 2020 – Current

- Developing transformer and other deep models for physiological sensor time-series data
- Modeling disease development with Continuous-Time Hidden Markov Models
- Research interests are in modeling and predicting with temporal deep learning methods

Systems & Technology Research

Machine Learning Researcher/Software Engineer

Boston, MA
Jan 2020 – Aug 2020

- Spearheaded machine learning initiatives within the cybersecurity vulnerability research
- Created a reinforcement learning method with greybox mutation-based fuzzer for speech processing
- Developed a seq2seq VQ-VAE WaveRNN decoder for unsupervised representation learning of audio
- Worked on frontend UI and backend data retrieval, visualization, and unit testing

Medtronic plc

AI/Data Science Engineer Contractor

New Haven, CT
May 2019 – Dec 2019

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

BioSwift Biomedical Engineering Design Team

Former Chief Executive Officer and Co-Founder

Baltimore, MD
Aug 2018 – Dec 2019

- Designed inhaler attachment to assist pediatric asthmatic patients
- 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 Releases:
 - <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>

PERSONAL PROJECTS

Modeling A Transferable Histopathological Image Analysis System

Dec 2019

- Developed a deep clustering representation learning method for histopathology images
- Won Intuitive Surgical Best Deep Learning Project Award (\$800 cash prize) out of ~40 total submissions
- Press Release:
 - <https://www.cs.jhu.edu/2020/01/28/deep-learning-course-prepares-students-for-success-in-ai-careers/>

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MACHINE LEARNING PUBLICATIONS

Xu, M., Moreno, A. Aydemir V.B., Nagesh, S., Reh, J. PulseImpute: A Novel Benchmark Task and Transformer Architecture for Imputation of Physiological Signals. In Review at ICML. 2022.

Xu, M., Reh, J. Rozga, A., McDaniel, J., Yoder, P., Watson, L., Brady, N. Discovering Novel Predictors of Minimally Verbal Outcomes in Autism through Computational Modeling. In Review at International Society for Autism Research. 2021.

Liu, Y., Moreno, A.[†], **Xu, M.**[†], Li, S., McDaniel, J., Brady, N., Rozga, A., Li, F., Song, L., Reh, J. Efficient Learning and Decoding of the Continuous-Time Hidden Markov Model for Disease Progression Modeling. In Review at JMLR. arXiv [cs.LG]. 2021 Retrieved From <http://arxiv.org/abs/2110.13998> (†Co-second authors)

BIOINFORMATICS PUBLICATIONS

Pomeranz Krummel, D., Nasti T., Kaluzova, M., Kallay, L., Melms, J., Izar, B., **Xu, M.**, Bhattacharya, D., Burnham, A., Ahmed, T., Li, G., Lawson, D., Kowalski, J., Cook, J., Medvedovic, M., Jenkins, A., 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. International Journal of Radiation Oncology. 2020. DOI: <https://doi.org/10.1016/j.ijrobp.2020.10.025>

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>

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., Tranchese, 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.

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>

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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, A., **Xu, M.**, Martinson, D., Tranchese, 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>