Abuzar Mahmood — Curriculum Vitae

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Education

Ph.D., Neuroscience, Brandeis University, Waltham, MA — 2023 - GPA: 3.98 - Thesis Advisor: Donald B. Katz - Thesis Title: *Multi-region Coordination for Taste Processing in the Rodent Brain*

M.S., Neuroscience, Brandeis University, Waltham, MA — 2019 - GPA: 3.96

B.S., Physics, University of Missouri, Columbia, MO — 2017 - GPA: 3.95 (Summa Cum Laude) - Minors in Mathematics, Chemistry, Biology, and Computational Neuroscience

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Employment History

Postdoctoral Research Fellow, Tufts Medical Center, MA — July 2023 – Present - Project: Bioinformatics analysis of the effect of AT2R activation on cardiomyopathy in obesity and diabetes

Postdoctoral Fellow, Brandeis University, MA — Nov 2023 – Present - Swartz Foundation Computational Neuroscience Postdoctoral Fellow (2023–25) - Project: Dynamics of information flow during the evoked taste response

Postdoctoral Associate, Brandeis University, MA — Mar 2023 – Nov 2023 - Project: Dynamics of information flow during the evoked taste response

Ph.D. Researcher, Brandeis University, MA — 2017 – Feb 2023 - Thesis Advisor: Donald B. Katz - Thesis Title: *Multi-region Coordination for Taste Processing in the Rodent Brain* - Investigated dynamics of coordination between the basolateral amygdala and gustatory cortex; tested whether the regions phenomenologically behave as an attractor network

Data Science Intern, Trackstar, NY — 2022 - Developed computational models to detect outliers and changepoints in online timeseries data; contributed to infrastructure for online inference

Undergraduate Researcher, University of Missouri, MO — 2013–2017 - Research Advisor: Lakshmi Pulakat - Projects investigating novel pharmaceutical drugs for treatment of cardiovascular disease and diabetes

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Current Projects

0.3.1 Neuroscience

1. Mazzio, C., Flashman, S., Baas-Thomas, N., Mahmood, A., Lin, J.Y., & Katz, D.B. (2026). Cortical Dynamics Underlying Learned and Non-Learned Aversive Behavior.
2. Rohrer, D.M., Nobili, C.C.C.M, Jiang, W., Mahmood, A., Knight, R.A., Gutsell, J., Katz, D.B. Am I Disgust? Exploring Disgust Responses Across Stimuli.
3. Calia-Bogan, V., Steindler, J., Katz, D.B., Mahmood, A. Characterizing Intra-State Dynamics of Gustatory Cortical Taste-Evoked Activity.

0.3.2 Cardiovascular Disease and Diabetes

1. Chaudhary, P.K., Mahmood, A., Valencia, D., Reyelt, L., Hines, I., Zhang, Y., et al. Development of Stage-4 Pressure Ulcer Models in Rat.
2. Mahmood, A., Kiet Duong A., Mansour, A., and Pulakat, L. CNN-assisted semi-automated histological evaluation of interstitial and perivascular fibrosis.
3. Mahmood, A.*, Mehm, A.*, Mooney, B., DeMarco, V.G., Pulakat, L. Feeding Satiation-Resistant

Rat Strain as a Model for Obesity, Diabetes, and Heart Failure. *Co-first authors

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Publications

0.4.1 Neuroscience

1. Baas-Thomas, N.*, Mahmood, A.*, Wang, Y., Katz, D.B. The Ingestive Response Reflects Gustatory Cortical Neural Dynamics. *(In press)*, eLife. *Co-first authors
2. Mukadam, N., Mahmood, A., Cronin-Golomb, A., DeGutis, J. Subjective Cognitive Concerns and Global Metacognitive Bias in Prodromal Parkinson's and Parkinson's Disease without Cognitive Impairment. *Neuropsychology (In press).*
3. Mahmood, A., Steindler, J., Katz, D.B. (2026). Sensory and palatability coding of taste stimuli in cortex involves dynamic and asymmetric cortico-amygdalar interactions. *Journal of Neurophysiology.*
4. Mahmood, A. (2025). pytau: A Python package for streamlined changepoint model analysis in neuroscience. *Journal of Open Source Software*, 11(117), 8509.
5. Mahmood, A., Steindler, J., Germaine, H., Katz, D.B. (2023). Coupled Dynamics of Stimulus-Evoked Gustatory Cortical and Basolateral Amygdalar Activity. *Journal of Neuroscience*, 43(3), 386–404.
6. Stone, B.T., Lin, J.-Y., Mahmood, A., Sanford, A.J., and Katz, D.B. (2022). LiCl-induced sickness modulates rat gustatory cortical responses. *PLOS Biology* 20, e3001537.
7. Lin, J.-Y., Stone, B.T., Herzog, L.E., Nanu, R., Mahmood, A., and Katz, D.B. (2021). The function of groups of neurons changes from moment to moment. *Current Opinion in Physiology* 20, 1–7.

0.4.2 Cardiovascular Disease and Diabetes

1. Belenchia AM, Boukhalfa A, DeMarco VG, Mehm A, Mahmood A, Liu P, et al. (2023). Cardiovascular Protective Effects of NP-6A4, a Drug with the FDA Designation for Pediatric Cardiomyopathy, in Female Rats with Obesity and Pre-Diabetes. *Cells* 12(10):1373.
2. Gavini, M.P.*, Mahmood, A.*, Belenchia, A.M., Beauparlant, P., Kumar, S.A., Ardhanari, S., et al. (2021). Suppression of Inflammatory Cardiac Cytokine Network in Rats with Untreated Obesity and Pre-Diabetes by AT2 Receptor Agonist NP-6A4. *Frontiers in Pharmacology* 12. *Co-first authors
3. Lum-Naihe, K., Toedebusch, R., Mahmood, A., Bajwa, J., Carmack, T., Kumar, S.A., et al. (2017). Cardiovascular disease progression in female Zucker Diabetic Fatty rats occurs via unique mechanisms compared to males. *Sci Rep* 7, 17823.
4. Luck, C., DeMarco, V.G., Mahmood, A., Gavini, M.P., and Pulakat, L. (2017). Differential Regulation of Cardiac Function and Intracardiac Cytokines by Rapamycin in Healthy and Diabetic Rats. *Oxidative Medicine and Cellular Longevity* 2017, 1–17.
5. Arnold, N., Mahmood, A., Ramdas, M., Ehlinger, P.P., and Pulakat, L. (2017). Regulation of the cardioprotective adiponectin and its receptor AdipoR1 by salt. *Can. J. Physiol. Pharmacol.* 95, 305–309.
6. Gul, R., Mahmood, A., Luck, C., Lum-Naihe, K., Alfadda, A.A., Speth, R.C., and Pulakat, L. (2015). Regulation of cardiac miR-208a, an inducer of obesity, by rapamycin and nebivolol. *Obesity* 23, 2251–2259.
7. Mahmood, A., and Pulakat, L. (2015). Differential Effects of -Blockers, Angiotensin II Receptor Blockers, and a Novel AT2R Agonist NP-6A4 on Stress Response of Nutrient-Starved Cardiovascular Cells. *PLOS ONE* 10, e0144824.

Published Abstracts

1. Mansour A, Herlihy M, Mahmood A, Mooney B, Gavini MP, Sun H, and Pulakat L. Preventing colistin nephrotoxicity caused by systemic delivery via localized, needle-free transdermal delivery of colistin methanesulfonate micromist. *Journal of Biological Chemistry*, ASBMB, Chicago, IL (May 2025)
2. Pulakat L, DeMarco VG, Mahmood A, Mehm A, Tang Y, Martin GL, et al. Proteomics of the cardiopulmonary pathology in an obese and diabetic female rat model – Evidence for a new female HFpEF rat model. *9th International Caparica Conference on Analytical Proteomics*, Lisbon, Portugal (2024)
3. Pulakat L, Mahmood A, Belenchia A, Gavini M, Liu Pi, Mooney B, et al. Abstract 14318: Sex Differences in Treatment Responses to NP-6A4, a Cardiomyopathy Drug With the FDA Designation, in Heart Disease Induced by Untreated Obesity. *Circulation* 144(Suppl_1):A14318 (2021)
4. Gavini MP, Mahmood A, Belenchia AM, Beauparlant P, Kumar S, Ardhanari S, et al. Abstract 16430: Activation of AT2 Receptor by NP-6A4 Improves Cardiac Function by Inducing a Novel Cardio-Reparative Protein-Micro RNA Network in Zucker Obese Rats With Untreated Obesity and Diabetes. *Circulation* 140(Suppl_1):A16430 (2019)
5. Toedebusch R, Lum-Naihe K, Mahmood A, Bajwa J, Kumar S, Ardhanari S, et al. Mechanistic insights into diabetes and the progression of cardiovascular disease in female rats. *The FASEB Journal* 31(S1):1014.17 (2017)
6. Pulakat L, Gavini M, Mahmood A, Belechia A, Toedebusch R, Beauparlant P, et al. Abstract P353: Attenuation of Cardiac Fibrosis, Hypertrophy and Myopathy by AT2R Agonist NP-6A4. *Hypertension* 70(suppl_1):AP353 (2017)
7. Mahmood A, Raja A, Pulakat L. Droplette – A Fluid Dynamics Driven Platform for Transdermal and Intra-Cellular Delivery of Large Molecules. *The FASEB Journal* 31(S1):924.7 (2017)
8. Belenchia AM, Beauparlant P, Mahmood A, Bajwa J, Zhang Q, Khare S, et al. Cardiovascular Protective vs. Anti-Cancer Properties: Novel Actions of the AT2R Agonist, NP-6A4. *The FASEB Journal* 31(S1):lb680 (2017)
9. Beauparlant P, Mahmood A, Toedebusch R, DeMarco V, Ardhanari S, Kumar S, et al. Cardiovascular Protective Effects of AT2R Activation by Peptide Drug NP-6A4. *The FASEB Journal* 31(S1):688.10 (2017)
10. Mahmood A, Pulakat L. Abstract P623: Nutrient Stress Response of Cardiovascular Cells to -Blockers, ARB and AT2R Agonists. *Hypertension* 66(suppl_1):AP623 (2015)
11. Mahmood A, Gul R, Luck C, Pulakat L. Role of Cardiac mir-208a in Nebivolol-Mediated Signaling. *The FASEB Journal* 29(S1):716.15 (2015)
12. Lum-Naihe K, Raja A, Bajwa J, Mahmood A, Luck C, Emter C, et al. Sex Differences in the Progression of Diabetes-associated Cardiac Pathology. *The FASEB Journal* 29(S1):964.9 (2015)
13. Lum-Naihe K, Mahmood A, Bajwa J, Emter CA, Pulakat L. Abstract P636: Sex Differences in Cardioprotective AT2R Expression in Diabetic Rats and Its Correlation with Myocardial Damage. *Hypertension* 66(suppl_1):AP636 (2015)

Poster Presentations

1. Mahmood A., Mansour A., Duong K.A., Pulakat L. Machine learning-assisted semi-automation of interstitial fibrosis measurement in cardiac sections. *MCRI Retreat 2025*, Woods Hole — Honorable Mention
2. Mahmood A., DeMarco V.G., Mehm A., Tang Y., Martin G.L., Agrawal S., Mooney B., Pulakat L. Impact of NP-6A4 on the pathology of heart-lung continuum in a female model for metabolic syndrome and heart failure with preserved ejection fraction. *2024 Angiotensin Conference GRC*, Lucca, Italy (2024)

3. Mahmood A., Steindler J., Katz D.B. Basolateral Amygdala and Gustatory Cortex interact bidirectionally during taste processing in rodents. *Society for Neuroscience Annual Meeting* (November 2024)
4. Mahmood A., Mehm A., Liu P., Mooney B., Gavini M.P., Tang Y., and Pulakat L. Characterizing pathology and signaling in obese and diabetic female rats with heart disease as a model for HFpEF. *MCRI Annual Retreat*, Woods Hole, MA (September 2024)
5. Mahmood A., Steindler J., Katz D.B. Basolateral Amygdala and Gustatory Cortex interact bidirectionally during taste processing in rodents. *Society for Neuroscience Annual Meeting* (November 2023) — Attendance supported by Society for Neuroscience Trainee Professional Development Award
6. Mahmood A., Steindler J., Stone B.T., Katz D.B. Dynamic Coupling of Taste-Evoked Gustatory Cortical and Basolateral Amygdalar Activity. *ACHEMS XLV*, FL (April 2023)
7. Mahmood A., Steindler J., Stone B.T., Katz D.B. Gustatory Cortex and Basolateral Amygdala Communication in Innate Taste Processing. - *International Symposium on Olfaction and Taste*, Portland, WA (August 2020) - First Place, Graduate Poster Competition, Volen Center for Complex Systems Retreat (Sept 2021)
8. Mahmood A., Luck C., DeMarco V.G., Gavini M., and Pulakat L. Differential Regulation of Cardiac Function and Intracardiac Cytokines by Rapamycin in healthy and diabetic rats. *University of Missouri Cardiovascular Day XXIV Poster Competition* (Feb 2017) — First Place, Undergraduate Competition
9. Mahmood A., Gavini M., Senthilkumar A., Carmack T., DeMarco V., and Pulakat L. Investigating the role of the Angiotensin II Type 2 Receptor in Protective Cardiac Remodeling. *University of Missouri Summer Forum* (July 2016)
10. Mahmood A., Raja A., Gavini M., and Pulakat L. Droplette — a Novel Method of Low-Pressure Transdermal Delivery to Chronic Wounds. *Missouri Life Sciences Week* (Apr 2016) — First Place, Undergraduate Competition, Life Science and Biomedical Engineering Technologies and Informatics category
11. Mahmood A., and Pulakat L. Improved Survival of Nutrient-Starved Human and Mouse Cardiovascular Cells by A Novel AT2 Receptor Agonist NP-6A4. - *Nutrition and Exercise Physiology Corporate Affiliate Board Meeting* (Nov 2015) - *University of Missouri Health Sciences Research Day* (Nov 2015)
12. Mahmood A., and Pulakat L. Nutrient Stress Response of Cardiovascular Cells to -Blockers, ARB and AT2R Agonists. - *University of Missouri Undergraduate Research and Creative Achievements Summer Forum* (July 2015) - *Harry S. Truman VA Research Week Poster Competition* (Sept 2015) - *Hypertension 2015 Scientific Sessions* (Sept 2015)
13. Mahmood A., Gul R., Luck C., and Pulakat L. Role of Cardiac mir-208a in Nebivolol-Mediated Signaling. *Experimental Biology*, Boston (March 2015)
14. Mahmood A., and Pulakat L. Differential Effects of -Blockers and a Novel AT2R Agonist on Cardiovascular Cells. - Awarded Distinction, *University of Missouri Cardiovascular Day XXII Poster Competition* (Feb 2015) - *Missouri Life Sciences Week Poster Competition* (April 2015) - *University of Missouri Undergraduate Research and Creative Achievements Spring Forum* (April 2015)
15. Mahmood A., and Pulakat L. Electrical Impedance-Based Measurement of Cardiomyocyte Response to Cardio-protective Drugs. *University of Missouri Health Sciences Research Day* (Nov 2014)
16. Mahmood A., Gul R., and Pulakat L. Modulation of Electrical Impedance of cardiomyocytes by Nebivolol and novel AT2 Receptor Agonists. - *Harry S. Truman VA Research Week Poster Competition* (May 2014) - *Missouri Life Sciences Week Poster Competition* (April 2014)

0.6.1 Co-Authored Poster Presentations

1. Mansour A., Herlihy M., Mahmood A., Velasquez F., Duong K., Hines I., Martin G., Chaudhary P.K., Gavini M.P., Sun H., Pulakat L. Preventing colistin nephrotoxicity caused by systemic delivery via localized, needle-free transdermal delivery of colistin methanesulfonate micromist. *MCRI Retreat 2025*, Woods Hole, MA
2. Chaudhary P.K., Mahmood A., Nasencia D., Reyelt L., Hines I., Zhang Y., Duong A., Martin G., Gavini M.P. A novel siRNA therapy delivered via needle-free therapeutic micromist to expedite chronic wound healing and improve survival. *MCRI Retreat 2025*, Woods Hole, MA
3. Baas-Thomas N., Mahmood A., Maigler K., Wang Y., and Katz D.B. The Ingestive Response Reflects Neural Dynamics in the Gustatory Cortex. *ACHEMS*, FL (April 2025)
4. Gray T.R., Mahmood A., Craddock A.E., White A.S., Goldstein I., Katz D.B. Gustatory-Olfactory Cortical Interactions in Response to Multimodal Stimuli. *ACHEMS*, FL (April 2025)
5. Pulakat L., Mahmood A., Mansour A., Chen H., Valencia D., Zhang Y., Gavini M. A Novel Preclinical Model for Obesity-Associated Stage 4 Pressure Ulcer and A Promising RNA-Based Therapeutic Approach. *Military Health System Research Symposium*, FL (Aug 2025)
6. Xu C., Mahmood A., Mansour A., and Pulakat L. Evaluation of the effect of human mesenchymal stem cells on diabetic foot wound in a rat model with severe diabetes. *Tufts Myocardial Research Institute Annual Retreat*, Woods Hole, MA (September 2024)
7. Calia-Bogan V., Mahmood A., Steindler J.R., Katz D.B. Taste-Evoked Intra-Epoch Dynamics in Gustatory Cortex. - *ACHEMS*, FL (April 2025) - *Society for Neuroscience Annual Meeting* (November 2024) - *Brandeis Sci-Fest*, Waltham, MA (Aug 2024)
8. Pulakat L., DeMarco V.G., Mahmood A., et al. Cardiac and extracardiac pathology of a preclinical model for female-specific HFpEF syndrome. *AHA Hypertension Scientific Session*, Chicago, IL (Sept 2024)
9. Baas-Thomas N., Mahmood A., Wang Y., Katz D.B. Investigating the Neural Signals Driving the Consummatory Response in Rats. - *Society for Neuroscience Annual Meeting* (November 2024) - *International Symposium on Olfaction and Taste* (June 2024)
10. Mazzio C., Lin J.Y., Germaine H., Mahmood A., Katz D.B. Cortical Population Dynamics Underlying Learned And Unlearned Aversive Behavior. *ACHEMS XLV*, FL (April 2023)
11. Pulakat L., Mahmood A., Belenchia A., Gavini M., Liu P., Mooney B., Tang Y., Mehm A., and Demarco V.G. Sex Differences in Treatment Responses to NP-6A4, a Cardiomyopathy Drug With the FDA Designation, in Heart Disease Induced by Untreated Obesity. *American Heart Association Meeting* (Nov 2021)
12. Maigler K.M., Stone B.T., Mahmood A., Lin J.Y., and Katz D.B. The Contribution of Lateral Hypothalamus to Cortical Palatability Coding. *Association for Chemoreception Science Meeting* (April 2021)
13. Stone B.T., Mahmood A., Lin J.Y., and Katz D.B. Representation of Illness and its Functional Impact on Gustatory Processing. *International Symposium on Olfaction and Taste*, Portland (August 2020)
14. Gavini M.P., Mahmood A., Belenchia A.M., Beauparlant P., Kumar S.A., Ardhanari S., DeMarco V.G., and Pulakat L. Activation of AT2 Receptor by NP-6A4 Improves Cardiac Function by Inducing a Novel Cardio-Reparative Protein-Micro RNA Network in Zucker Obese Rats With Untreated Obesity and Diabetes. *American Heart Association Meeting* (Nov 2019)
15. Pulakat L., Gavini M.P., Mahmood A., Belenchia A.M., Beauparlant P., Kumar S.A., Ardhanari S., and DeMarco V.G. Attenuation of Cardiac Fibrosis, Hypertrophy and Myopathy by AT2R Agonist NP-6A4. *AHA Hypertension Meeting* (Sept 2017)
16. Belenchia A.M., Beauparlant P., Mahmood A., Bajwa J., Zhang Q., Khare S., and Pulakat L. Cardiovascular Protective vs. Anti-Cancer Properties: Novel Actions of the AT2R Agonist, NP-6A4. *Experimental Biology Meeting* (April 2017)

17. Toedebusch R., Lum-Naihe K., Mahmood A., Bajwa J., Kumar S., Ardhanari S., Demarco V., and Pulakat L. Mechanistic insights into diabetes and the progression of cardiovascular disease in female rats. *Experimental Biology Meeting* (April 2017)
18. Beauparlant P., Mahmood A., Toedebusch R., Kumar S., Ardhanari S., Demarco V., and Pulakat L. Cardiovascular Protective Effects of AT2R Activation by Peptide Drug NP-6A4. *Experimental Biology Meeting* (April 2017)
19. Lum-Naihe K., Toedebusch R., Mahmood A., Bajwa J., Carmack T., Kumar S.A., Ardhanari S., DeMarco V.G., Emter C.A., and Pulakat L. Sex Differences in the Expression of Cardiac miR-29 Family microRNAs in Diabetic Male and Female Rats and its Correlation with Increased Risk for Cardiac Damage in Diabetic Females. *Missouri Life Sciences Week* (April 2016) — Honorable Mention, Graduate Competition, Molecular and Cellular Biology
20. Bajwa J., Mahmood A., Gavini M., Pulakat L. Regulation of Neuroprotective Myeloid Cell Leukemia 1 by Rapamycin and AT2R Agonists in Dopaminergic Neuronal Cell Line. *Hypertension 2015 Scientific Sessions*, Washington DC (Sept 2015)
21. Lum-Naihe K., Raja A., Bajwa J., Mahmood A., Luck C., Emter C., Pulakat L. Sex Differences in the Progression of Diabetes-associated Cardiac Pathology. *Experimental Biology*, Boston (March 2015)
22. Arnold N., Mahmood A., Ramdas M., and Pulakat L. Suppression of the Cardio-protective molecule Adiponectin via a High-Salt Diet: A Potentially Pivotal Mechanism of Atherosclerosis in Salt-Induced Hypertension & Heart Disease. *University of Missouri Health Sciences Research Day* (Nov 2014)

Talks

Title	Venue	Year
	NIMH Computational Neuroscience Journal Club	2026
	Hamilos Lab Meeting, Whitehead Institute, MIT	2026
The Cortico-Amygdalar interaction dynamics underlying taste perception & action	MaTRIX Laboratory Meeting, Georgia Tech	Nov 2025
	Mathematical Biology Seminar, Brandeis University	2025
	Insights Team Meeting, Appcast Inc.	2025
The Cortico-Amygdalar interaction dynamics underlying taste perception & action	Systems Neuroscience Journal Club, Harvard Medical School	April 2025
Basolateral Amygdala and Gustatory Cortex Interact Bidirectionally during Taste Processing in Rodents	Swartz Foundation Annual Meeting, WA	2024
Basolateral Amygdala and Gustatory Cortex Interact Bidirectionally during Taste Processing in Rodents	Brandeis Neuro Postdoc Symposium, Waltham, MA	2024
Polak Young Investigator Award Lecture	Association for Chemoreception Sciences Annual Meeting, FL	2024

Title	Venue	Year
The only constant is change: Bespoke changepoint modelling in PyMC	PyMCon Web Series	2023
An Intro to Bayesian Modelling and Probabilistic Programming	Brandeis University, MA	2022
Gustatory Cortex And Basolateral Amygdala Coordination In Taste Processing	Brandeis University	Mar 2021, Oct 2021
Gustatory Cortex and Basolateral Amygdala Communication in Innate Taste Processing	NIH Blueprint Joint Symposium on Computational Neuroscience	2021
Role Of Gustatory Cortex And Basolateral Amygdala Communication In Taste Processing	Brandeis University	2020
The Nonlinear Population Dynamics of Cortical Taste Processing	Systems/Computational Neuroscience Journal Club, Brandeis University, MA	2019

Support, Fellowships, and Awards

Award	Year
Poster of Distinction, MCRI Annual Retreat	2025
ACCESS-CI Compute Grant, MED250058 NSF (Co-PI)	2025
Polak Young Investigator Award, Association for Chemoreception Sciences	2024
Computational Neuroscience Postdoctoral Fellowship, Swartz Foundation	2023–25
Trainee Professional Development Award, Society for Neuroscience	2023
ACCESS-CI Compute Grant, BIO230103 NSF (PI: Mahmood)	2023–25
XSEDE Compute Research Award, NSF	2019–22
First Place, Poster Competition, Volen Center for Complex Systems Retreat	2021
Computational Neuroscience Training Fellowship, NIH	2017–19
Academic Hardware Grant, NVIDIA	2018
Award for Academic Distinction, University of Missouri	2017
Clifford W. Tompson Scholarship, Department of Physics, University of Missouri	2016–2017

Award	Year
Curator's Grant in Aid Award, International Center, University of Missouri	2015–2017
Col. Arthur C. Allen Scholarship, College of Arts and Science, University of Missouri	2015–2017
Dean's List, College of Arts and Science, University of Missouri	2013–2017
International Merit Scholarship, International Center, University of Missouri	2013–2017
Junior Scholarship Award, Honors College, University of Missouri	2016
Life Sciences Undergraduate Research Opportunity, University of Missouri	2016
Rosemary Dishman Scholarship, Department of Physics, University of Missouri	2015
Sophomore Scholarship Award, Honors College, University of Missouri	2015
Undergraduate Research Travel Award, Office of Undergraduate Research, University of Missouri	2015
Newell S. Gingrich Undergraduate Scholarship, Department of Physics, University of Missouri	2014
Paul E. Basye Scholarship, Department of Physics, University of Missouri	2014
First Place, Undergraduate Poster Competition, Missouri LS Week	2016, 2017
Summer Research Fellowship, University of Missouri	2016
Distinction, University of Missouri Cardiovascular Day XXII Poster Competition	2015

Teaching

Workshop Instructor, Introduction to Git and GitHub, Brandeis University — 2024, 2025

Workshop Instructor, Probabilistic Programming and Bayesian Modeling, Brandeis University — 2021, 2025

Guest Lecturer, Advanced Data Analysis (with Dr. Shantanu Jadhav), Brandeis University — 2021 - Unsupervised clustering and Hidden Markov Modeling - Probabilistic Programming and Bayesian Modeling - LLM agent pipelines

Teaching Assistant, Applied Statistical Computing in R (with Prof. Xiaodong Liu), Brandeis University — 2021

Guest Lecturer and Teaching Assistant, Computational Neuroscience (with Dr. Leandro Alonso), Brandeis University — 2019 - Detecting circuit structure and non-random features in a connectivity matrix - Principal Component Analysis

Tutor, Quantitative Skills Center, Brandeis University — 2019

Teaching Assistant, Data Analysis and Statistics Workshop (with Prof. Paul Miller), Brandeis University — 2018

Mentorship

MCRI, Tufts Medical Center, MA - Alex Mansour, Undergraduate — Data Collection and Analysis (2024–25) - Kiet Duong, Undergraduate — Data Collection and Analysis (2024–25) - Charles Xu, MD student — Data Collection and Analysis (2024) - Abigail Wu, Summer Student (Research Science Institute) — Data Analysis (2024) - Nancy Hassan, Summer Student (Research Science Institute) — Data Analysis (2024)

Brandeis University, MA - Vincent Calia-Bogan, Undergraduate — Computational Modeling and Analysis (2023–25) - Computational Neuroscience Training Grant Awardee - Thesis: *Investigating intra-state dynamics in gustatory cortex* (High Honors) - First author on manuscript (In Preparation) - Hannah Germaine, PhD Rotation Student — Modeling and Data Analysis (2022) - Co-author on 1 published article - Victor Suarez, PhD Rotation Student — Data Analysis (2020) - Jessica Steindler, Post-Bac — Hardware construction, surgery, and data collection (2019–21) - Co-author on 2 published articles and 1 manuscript (In Preparation) - Thomas Murdy, Undergraduate — Surgery, data collection, and analysis (2020–21) - Thesis: *Investigating the BLA-GC interaction in CTA acquisition* (High Honors)

University of Missouri, MO - Paige Beauparlant, Undergraduate — Data collection (2017) - Laura Perry, Undergraduate — Data collection (2017) - Jamal Bajwa, Undergraduate — Data collection and analysis (2016–17)

Open-Source Contributions

Full list at github.com/abuzarmahmood

blech_clust — Spike-sorting library for multi-channel electrophysiological recordings featuring automated waveform classification and clustering, quality control, and data handling methods.

pytau — Python package for Bayesian changepoint modelling with multiple inference algorithms (MCMC/ADVI), Bayesian nonparametric priors, and streamlined batch processing and model tracking. Published in JOSS.

neuRecommend — XGBoost-based extracellular electrophysiology spike-waveform classifier.

Autoslide — Convolutional neural network-based semi-automated evaluation of perivascular fibrosis in histological sections.

Skills

Experimental - Stereotactic rodent surgeries, chronic implantation of multielectrode bundles and optical fibers

Software - Python, R, MATLAB, Linux - MySQL and PostgreSQL (pgAdmin4, psycopg2) - Computing cluster environments (Brandeis, XSEDE Jetstream, ACCESS-CI)

Modeling - *Machine Learning:* Standard models for regression, classification, and clustering; dimensionality reduction; time-series models (ARIMA, Holt-Winters, HMMs, changepoint models); probabilistic modeling and Bayesian inference including nonparametric priors - *Statistics:* Frequentist techniques (parametric/non-parametric), Bayesian statistics (hierarchical models, MCMC), computational neuroscience models (point-process models, drift-diffusion model) - *Frameworks:* numpy, scipy, scikit-learn, TensorFlow/Keras, PyMC3, pandas, PySpark, Kubernetes, AWS EC2 and ECS, HPC

Formal Coursework - Mathematical Statistics, University of Missouri (2017) - Statistical Machine Learning, Brandeis University (2018) - Computational Neuroscience, Brandeis University (2019) - Bayesian Inference and Computational Statistics, Brandeis University (2019) - Advanced Data Analysis and Modeling, Brandeis University (2020)

Certifications - DeepLearning.AI TensorFlow Developer Specialization, Coursera (2021) - Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning - Convolutional Neural Networks in TensorFlow - Natural Language Processing in TensorFlow - Sequences, Time Series and Prediction - Advanced Visualizations in Python, Coursera (2022) - DeepLearning.AI Machine Learning in Production Specialization, Coursera (2022) - Introduction to Machine Learning in Production - Machine Learning Data Lifecycle in Production - Machine Learning Modeling Pipelines in Production - Deploying Machine Learning Models in Production