Jacob Mashburn

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Professional Summary

Mathematics PhD at Texas A&M University, with research emphasis in Probability and proficiency in programming, machine learning, and data analysis. Accustomed to working in a collaborative environment with peers of diverse views, and effective at distilling information and communicating results to experts and non-experts. Looking for work in positions related to machine learning, data science, and/or data analysis.

Skills

- **Languages & Platforms:** Python, C++, MATLAB, SQL, LaTeX, R, Keras, TensorFlow
- **Machine Learning:** Regression, PCA, Deep Learning, Audio Signal Processing, NLP
- **Quantitative:** Probability, Statistics, Stochastic Processes, Combinatorics, Data Science

Experience

Doctoral Mathematics Probability Researcher, *TAMU Mathematics Department* Aug 2016 to Aug 2022

- Innovated in the field of probability theory, developing a framework of operators found in quantum mechanics.
- Strong presentation skills with experts and non-experts, as evidenced by 11 invited and contributed talks.
- Collaborated with diverse teams in-person and virtually, resulting in two academic papers.

Graduate Python and Teaching Assistant, *TAMU Mathematics Department* Aug 2016 to Aug 2022

- Instructed over 700 students in Python and MATLAB programming across 7 semesters with a 94% pass rate.
- Taught a mixed topics course which included statistics, graph theory, and cryptography for 4 semesters.
- Managed change during the COVID-19 pandemic by moving my Spring 2020 class online to Zoom in under a week.

MATLAB Research Assistant, *TAMU Mays Business School* Aug 2015 to Aug 2016

- Developed MATLAB simulations to supplement Dr. Korok Ray's economic research, which were used in 2 papers.
- Edited Dr. Ray's research papers, from draft to journal-ready version, with LaTeX, resulting in 7 journal submissions.
- Trained 2 new employees in MATLAB and LaTeX programming.

Selected Projects

Audio Sample to FM Synthesis Predictor, *Personal Project* Sep 2022 – Feb 2023

- Designed neural networks with TensorFlow and Keras to generate, given an audio sample, a patch file for a Yamaha FM synthesizer to replicate it, resulting in mean absolute error less than 2 across 37 targets.
- Analyzed audio sample data taken from synthesizer output using signal processing techniques.
- Cleaned and extracted features from data with spectrograms, rescaling, PCA, etc.

Baker Hughes Visualization Challenge - 2nd Place, *TAMU Datathon* Oct 2022

- Collaborated with a team of individuals with diverse backgrounds resulting in 2nd place in this challenge.
- Analyzed data from gas turbine engine factors to identify potential advancements toward a sustainable energy model.
- Cleaned data using R, then produced heatmaps and scatterplots using Python, and presented them to judges.

DS Competition - Finalist and Best Use of External Data, *TAMU Institute of Data Science* Apr 2022

- Collaborated with a team of graduate students to produce visuals on the state of interdisciplinary research between the TAMU Mathematics, Statistics, and Computer Science departments, resulting in a finalist placing.
- Mined research article metadata, then cleaned and augmented it by cross-referencing with Cornell's arXiv database.
- Produced and presented visualizations to a panel of judges including active TAMU researchers.

Leadership

Weekly Seminar Organizer, TAMU Mathematics Graduate Student Organization Aug 2019 to May 2022

- Curated each semester's schedule by inviting speakers from department faculty and graduate students.
- Managed change through the COVID-19 pandemic by moving the seminar to Zoom and scheduling around many conflicts caused by the pandemic.

Publications

Fock representations of free convolution powers Jul 2022
M. Anshelevich, J. Mashburn arxiv.org/abs/2207.12481

Some Fock spaces with depth two action Mar 2021
M. Anshelevich, J. Mashburn arxiv.org/abs/2103.13936

Education

Texas A&M University, *PhD in Mathematics* Aug 2016 to Aug 2022
Texas A&M University, *B.A. Mathematics* Aug 2012 to May 2016