Amy Peterson

Mathematician, Data Scientist

1874 Campus Delivery
Fort Collins, CO 80523
amy.peterson@colostate.edu
Webpage
LinkedIn

Education

May 2019 **University of Connecticut**, *Ph.D. Mathematics*, .
Dissertation: Gaussian Limits and Polynomials on High Dimensional Spheres.
Advisor: Dr. Ambar Sengupta

May 2014 **Auburn University**, *M.S. Mathematics*.

May 2011 **Auburn University**, *B.S. Mathematics*.

Skills & Abilities

Language **R, Python**.
These are the programming languages I'm very familiar with. A few main packages I've used are: numpy, pandas, sklearn, DESeq2, edgeR, ReactomePA, XGboost, Plotly, Leaflet.

Language **Matlab, MySQL**.
These are languages I have some experience with.

Software **Latex, MS Office, Tableau**.
These are software I've used in various projects.I am very experienced with LaTex and MS office I have some minor experience with Tableau.

Work Projects

Aug 2020 –present **Zoetis Project**.
I worked on feature selection and pathway analysis of full RNAseq data for a project from company Zoetis.

Jan 2020 –present **DTRA project: Kenya clinical data for outbreak detection**.
I cleaned clinical reports, matching free text diagnoses to ICD-10 codes. Further I analyzed disease and symptom reports for relationships using outbreak and anomaly detection including: Hidden Markov Models, MSET+SPRT, ARIMA, SIR, and neural networks.

Jan. 2020 – Present **THOR: RNAseq data from Salmonella infected Mice**.
I worked on setting up the RNAseq processing pipeline for full RNAseq data including: fastQC, Trimmomatic, STAR, featureCounts, as well as differential gene expression analysis and analysis on TMM-normalized count for mice who were infected with salmonella. I also used a sparse CCA to relate cytokines to gene expression data.

Oct.2019– Jan.2020 **Wearable Data from Profusa**.
I performed Canonical Correlation Analysis on wearable data such as heart rate, respiratory rate, etc and blood oxygen levels as part of a collaboration with company Profusa. I also examined time delayed embeddings combined with Hidden Markov Models (HMMs) on relevant medical data.

Aug 2018 – Aug 2019 **MIMIC Database**.
I began initial analyzing and processing of general medical data from MIMIC-III repository lead by the UConn Health: Center for Quantitative Medicine for the utilization of topological data analysis techniques with R and Postgres.

Work Experience

Aug 2019 – Present **Postdoctoral Fellow**, Colorado State University, Fort Collins, CO.
PI: Dr. Michael Kirby.
I am employed to work on various data science projects which are outlined above in Work Projects. For all projects verbal reports and decks are presented regularly. I also taught Calculus I and Linear Algebra.

Aug 2017 – May 2019 **Graduate Student/Graduate Teaching Assistant**, University of Connecticut.
Adviser: Dr. Ambar Sengupta
As part of my graduate research I researched infinite dimensional Gaussian spaces and taught a variety of courses including Calculus and Probability.

Aug 2014 – May 2017 **Graduate Student/Graduate Teaching Assistant**, Louisiana State University.
Adviser: Dr. Ambar Sengupta
I began my PhD at LSU and transferred to University of Connecticut to continue working with my adviser.

Publications

- **Early prognosis of respiratory virus shedding in humans.** Aminian, Manuchehr, Ghosh, Tomojit, Peterson, Amy, Rasmussen, Angela L., Stiverson, Shannon, Sharma, Kartikay and Kirby, Michael. 2020. accepted to Scientific Reports.
- **Exploring Musical Structure Using Tonnetz Lattice Geometry and LSTMs**. Aminian, Manuchehr, Kehoe, Eric, Ma, Xiaofeng, Peterson, Amy and Kirby, Michael. Computational Science – ICCS 2020 (2020) pg.414–424. DOI: 10.1007/978-3-030-50417-5_31
- **Polynomials and high-dimensional spheres**. Peterson, Amy and Sengupta, Ambar. Nonlinear Analysis-theory Methods & Applications vol. 187 (2019) pg 18-48. DOI: 10.1016/j.na.2019.03.023
- **Limiting Means for Spherical Slices.** Peterson, Amy and Sengupta, Ambar. Communications on Stochastic Analysis 12 (2019) no.3. Article 4. DOI: 10.31390/cosa.12.3.04
- **The Gaussian Limit for High Dimensional Spherical Means.** Peterson, Amy and Sengupta, Ambar. Journal of Functional Analysis. 276 (2018), no.3, pg. 815-866. DOI: 10.1016/j.jfa.2018.06.020