Kamal Pangeni, Ph.D.

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Professional Profile

Trained as a theoretical high energy physicist, I enjoy solving complex problems with innovative ideas. My background in physics provides a solid foundation for quantitative problem solving skills. I have extensive experience in data manipulation, data analysis, building machine learning models, and deploying the product to end users at a large organization.

Areas of Expertise

- Supervised and Unsupervised Machine Learning
- Natural Language Processing
- Mathematical modeling
- Monte Carlo modeling and simulations
- Deep Learning
- Statistical analysis
- Algorithm development and implementation
- Problem solving

Skills

Computer Languages: Python, Mathematica, SQL, MATLAB, C++, java, LaTeX
Data analysis and visualization: Numpy, Pandas, Matplotlib, Seaborn, QlikView, QlikSense
Machine Learning: Scikit-Learn, Keras, XGboost, LightGBM, Tensorflow, Pytorch
AutoML: H20.ai, DataRobot
Languages: English, Nepali, Hindi, Urdu

Experience

Senior Data Scientist **@CVS Health** *Oct 2021-Present*

I build machine learning models to identify fraudulent pharmacies and providers as well as provided analytics support to integrated fraud waste and abuse product team

- Partnered with pharmacy auditing team and build a semi-supervised model to identify pharmacies similar to those already under audit. Established personas of various cluster identified. The result from this analysis was forwarded tot he pharmacy investigation team and the product partners
- Established the methodology and necessary codebase to built FWA data layer to monitor pharmacy fraud in prior authorization of certain durgs identified by the product team.
- Performed business case sizing for various Fraud Waste and Abuse ideas and create roadmap for execution..
- Clustering to categorize the adverse events from multiple sclerosis

Data Scientist - Machine Learning **@Mercy Hospital, St. Louis** *Feb 2018 - Sept 2021*

I developed machine learning models to drive operational efficiency and create profitability.

- Built and deployed machine learning models to predict the Diagnosis Related Group (DRG) for inpatient admissions. Within a year of its deployment, it has already saved more than 7 million dollars in hospital revenue. This project was selected as a finalist (in cost and efficiency category) at Mercy wide innovation conference.
- Developed Qlik Sense app to share the predictions from the model with medical coders who are currently using it to audit and review medical coding at Mercy.
- Built a Natural Language Processing model based on deep learning to predict the diagnosis for inpatient admission from physician notes.
- Estimated the financial impact of elective surgery cancellations due to COVID-19.
- Used Natural Language Processing techniques to automate the cancer registry case findings.

Graduate Research Assistant **@Washington University, St. Louis** *Aug 2013-Aug 2017*

I worked on several aspects of quantum chromodynamics (QCD) at nonzero temperature and density. My principle achievements included:

- Development and implementation of algorithms to find the saddle point of a multi-dimensional function, and perform multi-dimensional integration numerically, as required to study the phase structure of QCD and liquid-gas system.
- Computation of the mass spectrum and correlation functions in lattice models of QCD by numerically diagonalizing matrices of large dimensions.

- Perform multi-dimensional integral numerically using Monte Carlo techniques to calculate the rate of neutrino emission from neutron stars.

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Education

Washington University — St. Louis MO

Doctor of Philosophy in Physics 3.89/4 — Aug 2017

Dissertation: *Topics in QCD at nonzero temperature and density*

Masters of Science in Physics 3.79/4 — May 2013

Brigham Young University — Provo,UT

Bachelors of Science in Physics and Mathematics 3.7/4 — Jan 2007-Aug 2011

Machine Learning Courses on Coursera

Reinforcement Learning Specialization (4 courses) — *March 2020*

Introduction to TensorFlow for AI, ML and DL — *June 2019*

Deep Learning Specialization (5 Courses) — *May 2019*

How to Win a Data Science Competition — *June 2018*

Machine Learning — *Nov 2017*

Honors and Awards

- **Finalist in Mercy wide innovation conference** — **Oct 2019**
- **Winner of 1st Mercy Hackathon** [link] — **Sept 2019**
- **Arthur L. Hughes Fellow**, Washington University[link] — **Summer 2012**
- **University Fellow**, Washington University [link] — **2011 & 2013**
- **Harvery Fletcher Scholarship**, Brigham Young University — **2010/2011**
- **Academic Scholarship**, Brigham Young University — **2007-2010**
- **Physics Department Scholarship**, Brigham Young University — **2007-2010**

Publications

(Note: In high energy physics, name of authors are listed in alphabetical order)

- M. Alford, **K. Pangeni** and A. Windisch "Color Superconductivity and Charge Neutrality in Yukawa Theory", Physics Review Letters 120, 082701 (2018)
- H. Nishimura, M. Ogilvie and **K. Pangeni**, "Liquid-Gas Phase Transition and CK Symmetry in Quantum Field Theories", Physical Review D 95, 076003(2017).
- Mark Alford and **Kamal Pangeni** "Gap bridging enhancement of modified Urca process in nuclear matter.", Physical Review C 95, 015802 (2017).
- H. Nishimura, M. Ogilvie and **K. Pangeni**, "Complex mass spectrum in lattice QCD with static quarks at strong coupling", Physical Review D 93, 094501 (2016).
- H. Nishimura, M. Ogilvie and **K. Pangeni**, "Complex saddle points and disorder lines in QCD at finite temperature and density", Physical Review D 91,054004 (2015).
- H. Nishimura, M. Ogilvie and **K. Pangeni**, "Complex saddle points in QCD at finite temperature and density", Physical Review D 90,045039 (2014).