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, MATLAB, C++, java, LaTeX
Data analysis and visualization: Numpy, Pandas, Matplotlib, Seaborn, QlikView, QlikSense
Machine Learning: Scikit-Learn, Keras, XGboost, LightGBM, Tensorflow, Pytorch
Languages: English, Nepali, Hindi, Urdu

Experience

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

I develop 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 few months of its deployment, it has already saved more than 5 million dollars in hospital revenue. This project was selected as a finalist (in cost and efficiency category) at Mercy wide innovation conference.
- Built a NLP model based on deep learning to predict the diagnosis for inpatient admission from physician notes.
- 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.

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.

Undergraduate Research Assistant **@Brigham Young University** *May 2008-Aug 2011*

• I successfully constructed and tested a time-of-flight ion spectrometer that was later used in single photon radiation experiment. As part of the testing of the apparatus, I collected a large set of data from experiments and performed data analysis (primarily Mathematica).

• In making a brief transition to algebraic topology, I quickly learned new ideas and applied it to my research. My main focus was to identify different triangulations and circle packing on the surface of a sphere and use it to investigate the properties of knots with less than nine twist regions.

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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).