# Shu Liao

Address: College Station, Texas || Cell: (979) 985-1018 || Email: xx9liao@gmail.com || LinkedIn: linkedin.com/in/shuliao/

## EDUCATION

**Texas A&M University**, College Station, Texas GPA: 3.9 September 2014-May 2020(Expected)
PhD Candidate in Physics

**Georgia Institute of Technology**, Atlanta, Georgia GPA: 4.0 September 2018-December 2020(Expected)
MS in Computer Science
Relevant coursework: Computer Vision, Machine Learning, Database

**Peking University**, Beijing, China GPA: 3.4 September 2010-June 2014
BS in Physics
Relevant coursework: Introduction to Computation, Data Structure and Algorithm, Numerical Methods

## SKILLS

**Programming Languages**: Python, C++, SQL
**Scientific Computing**: Numerical simulation, High performance computing
**Machine learning**: Classical regression methods, Tree based methods, PCA, A/B Testing
**Tools**: MySQL, Tensorflow/Keras, AWS

## WORK EXPERIENCE

**Research Assistant, Texas A&M University, College Station, TX** September 2015-Present

- Designed Python package for simulating neutrino events and fitting new physics models using **hypothesis testing**
- Constructed **statistics models** for COHERENT neutrino experiment
- Published six papers and presented five public talks on neutrino phenomenology

## PROJECTS

**PyCE$\nu$NS: an open-source CE$\nu$NS calculator with MCMC sampling of new physics parameters and experimental systematics**
https://github.com/Ikaroshu/pyCEvNS

- Optimized for high performance and parallel computing in supercomputer using MPI, **numpy** and **scipy** python package
- Wrote package generating posterior probability distribution of parameters from user provided model
- Implemented various **hypothesis test** including Likelihood ratio test, Z-test, and Bayesian test using the Bayes factor
- Published four papers using this package in python by generating results from theoretical models

**Data Science Blog: a personal blog website built on Django**
https://shusblog.dev/

- Built a personal blog website using **Django** and **Nginx** to post articles on data science and other interesting topics
- Deployed this blog website on Amazon's **AWS**, posting article to this blog, and website stably running since March 2019

**Natural language processing and topic modeling on IMDB movie synopses**
https://shusblog.dev/post/4/, https://github.com/Ikaroshu/movie_synopsis_analyse

- Clustered the crawled 200 IMDB movie synopsis into 20 topics
- Preprocessed text by tokenizing and stemming, extracted features using **TF-IDF** approach
- Trained unsupervised learning of **K-means** and **LDA** to cluster movies to find topics

## PUBLICATIONS


- Searching for Beyond the Standard Model Physics with COHERENT Energy and Timing Data. arXiv:1903.10666.
- Neutrino scattering and B anomalies from hidden sector portals. JHEP, 2019(1), 91.
- Coherent elastic neutrino nucleus scattering as a probe of a Z′ through kinetic and mass mixing effects. PRD, 98(1), 015005.
- Accelerator and reactor complementarity in coherent neutrino-nucleus scattering. PRD, 97(3), 035009.
- Non-standard interactions of solar neutrinos in dark matter experiments. PLB, 773, 242-246.
- Probing light mediators at ultralow threshold energies with coherent elastic neutrino-nucleus scattering. PRD, 96(9), 095007.