Wei Shi

CONTACT INFORMATION

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https://gitlab.cern.ch/wshi

EDUCATION

Rice University, Houston, USA

Ph.D. Physics and Astronomy, June 2020 (estimate)
M.S. Physics and Astronomy, June 2017

- Proposal: *An Application of Multivariate Analysis to the EMTF p_T Look-Up-Table and Improvements to Dark Sector Searches*

Zhejiang University, Hangzhou, China

B.S. Physics, May 2015

- Thesis: *New Chalcogenide Materials Research*
- GPA: 3.49/4.00

EDUCATION EXPERIENCE

Rice University

Graduate Student 05/2016-Now

- Muon algorithm development
  - Regression and classification on p_T using boosted decision & regression trees(BDT) and k-nearest neighbour(k-NN) methods
  - p_T training/inference using convolutional neural network(CNN) on GPU/FPGA
- Prompt analysis
  - Pileup dependence study in EMTF
  - EMTF/CSCTF track p_T resolution and track building performance
  - Timing synchronization of local charged tracks in cathode strip chambers

Research Assistant 05/2016-Now

- Monte Carlo of DarkSUSY samples using bash, MadGraph 4&5
- Scale factor study of muon identification using Tag & Probe method for 2016 MC and CMS experiment data

Teaching Assistant 01/2016-06/2017

- PHYS 526 Statistical Mechanics
- PHYS 201 Modern Physics
- PHYS 126 Optics and Waves experiment

Superconducting Quantum Circuit Group, Zhejiang University

Internship 06/2013-06/2014

- Study quantum nondemolition(QND) measurement in superconducting quantum circuits
  - Design, assemble, test and calibrate the microwave circuit system used in QND measurement, including DAC/ADC boards, clocks, low pass filters, differential amplifiers, I-Q mixers and power dividers

- Initialize and calibrate FPGA on the DAC board with Quartus II Programmer; test and calibrate the specified output waveform, frequency spectrum and output phases via Python

Quantum Transport Lab, Rice University
Internship 07-09/2012, 2014

- Study 2D electron gas
  - Study the fabrication of 2D Niobium alloy films using magnetron sputtering and photolithography technology
  - Critical temperature measurement of films in cryogenic transport system with magnetic field
  - Realization of instantaneous instrument control over Keithley model 6221 for DC current source, data acquisition from nanovoltmeter model 2182A for direct voltage and Anritsu MG3684B for microwave power attenuation using LabVIEW
  - Calibration test on low-temperature thermometer CX-1050-AA with lock-in amplifier SR830 DSP and numeric curve fitting for temperature and resistance relationship using MATLAB

Additional Experience

CERN, Geneva, Switzerland
User 06/2017-08/2018

- Developer of level-1 trigger online control and monitor software
- Iterative level-3 muon reconstruction algorithm optimization in high level trigger
- CMS experiment operations
  - CMS shift leader
  - CMS data acquisition shifter
  - Level-1 trigger system on-call expert
  - Level-1 trigger shifter
  - EMTF subsystem on-call expert

UC Davis Crocker Radiation Laboratory, Davis, USA
Research Assistant 05/2017

- Total irradiation dose(TID) test of muon port card, including PROM, SPI flash memory and FPGA)
- Single Event Upset(SEU) test of optical receivers

Texas A&M University, College Station, USA
Visiting scholar 10/2016-09/2018

Citizens School Program, Houston
Organizer & Teacher 01/2017-05/2017

- Involved in designing one-semester-long "Fun with physics" program with other three physics PhD students; teach middle school students fundamental science law via hands-on experiments using scientific method
- Gave a 75-minute lecture on the waves topic for a class of 25 students; designed and carried hands-on experiments such as string phone, bending light using total reflection, and Doppler rocket

Rice Chinese Students and Scholars Association, Houston
Treasurer 05/2016-05/2017

- Funding & Grant application for the association
- Reimbursement and Audition of all expenses

PUBLICATION

Boosted Decision Trees in the Level-1 Muon Endcap Trigger at CMS

Search for beyond the Standard Model new light boson decaying into muon pairs at CMS

PROGRAMMING LANGUAGES

Proficient: ROOT, C/C++, Bash
Familiar: Python, MATLAB, Java, NodeJS, Polymer, CSS, LabVIEW, LaTeX