Ziheng Chen

PhD Candidate in High Energy Physics; iOS App Developer

EDUCATION

2015-Now **Northwestern University**, Ph.D, Chicago, US.
Experimental High Energy Physics. Expected to graduate in Dec 2020.

2011-2015 **Lanzhou University**, B.Sc., Lanzhou, China.
Physics. Graduate with honor.

Additional Education

2014 Summer **Stanford University**, Summer Quarter, Palo Alto, US.
Computer Graphics, Robotics. Fellowship from China Top undergraduate Training Program.

2013-2014 **Royal Holloway University of London**, Visiting Study, London, UK.
Physics and Math. Fellowship from Chinese Scholarship Council.

WORKING EXPERIENCE

2017 **Canon Medical**, CT Reconstruction Intern, Chicago, US.
Develop innovative photon scattering correction method for computed tomography (CT) scanners. Implement Monte Carlo simulation of dose distribution in CT scanners.

RESEARCH EXPERIENCE

2017-Now **Northwestern University**, Chicago, US.
Analyze data from Large Hadron Collider (LHC) collected by the CMS detector.

2017 and 2019 **European Organization for Nuclear Research (CERN)**, Geneva, Switzerland.
Develop a CUDA-based clustering algorithm for the future CMS High Granularity Calorimeter. Develop data acquisition system for testbeam of the CMS BCM1F Si-sensors and analyze testbeam data.

2019 Spring **Deutsches Elektronen-Synchrotron (DESY)**, Hamburg, Germany.
Setup and perform testbeam experiment for prototype of the CMS BCM1F Si-sensor.

2015 Spring **Thomas Jefferson National Accelerator Facility (JLab)**, Newport News, US.
Implement generator models of electron-proton deep inelastic scattering.

SKILLS

python C++ Swift NVIDIA CUDA

pandas $y_i t = \beta' x_{it} + \mu_i + \epsilon_{it}$ plotly PYTORCH TensorFlow

OpenCL Download on the App Store Apple ARKit GitHub

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PROJECTS

2017-Now **Testing Lepton Universality with a Precision Measurement of the W Boson Branching Fractions in Events with Pair Produced top Quarks**.
PhD Thesis. This project analyzes data from the Large Hadron Collider (LHC) collected by CMS detector to tests lepton universality in the Standard Model. Paper of 2016 run is ready for the CMS internal approval.

2019 **CLUE: A Fast Parallel Clustering Algorithm for High Granularity Calorimeters in High Energy Physics**.
Written in C++ with CUDA and TBB. Paper on arXiv soon. Github repository published soon.

2019 **Application and Performance of CLUE for HGCAL Reconstruction on CPU/GPU in the CMS Software Framework**.
Application and performance of CLUE clustering algorithm in the CMS Software framework (CMSSW). Presentation in the 24th International Conference on Computing in High Energy and Nuclear Physics (CHEP2019).

2019 **Deep Learning for Particle ID and Energy Regression of the CMS HGCAL Reconstruction**.
Train deep learning models for particle ID and energy regression. Integrate inference as a part of the CMS HGCAL reconstruction in CMSSW.

2019 **Testbeam of Prototype Si-Sensor of the CMS BCM1F at DESY**.
Setup testing platform for Si-Sensor using electron beam in the Deutsches Elektronen-Synchrotron (DESY). Develop data acquisition system and analyze data.

2017 **Offline Reconstruction Algorithms for the CMS High Granularity Calorimeter for HL-LHC**.
The initial generation of clustering algorithm for the CMS High Granularity Calorimeter. Presentation in 2017 IEEE Nuclear Science Symposium and Medical Imaging Conference.

2017 **Scattering Correction and Dose Mapping of CT scanner**.
Abstract of this project.

2016 **Simulation of Trapped Particles in MU2E Magnetic Field**.
Abstract of this project.

OTHER PROJECTS

2019 **TracksterViewer: An iOS App for 3D Augmented Reality Event Display for the Showers Simulation and Reconstruction of CMS HGCAL**.
Video of TracksterViewer.

2018 **ImageAlgo: PyPI Python Package for Clustering on GPU**.
PyPI page of ImageAlgo with Numpy, CUDA, OpenCL backends.

2017-2018 **Artimo: An iOS App for On-Device Deep Learning for Photo Artistic Stylization with Augmented Reality**.
Launched in Apple's AppStore in 2017-2018 with few hundreds of downloads across the world. Video and abstract of Artimo.

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