

# Chi Lung Cheng, Alkaid

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## Education

**University of Wisconsin-Madison**  
*Ph.D., Physics*  
**Chinese University of Hong Kong**  
*B.S., Physics*

Madison, WI  
2018 - current  
Hong Kong  
2018

## Awards and Honors

**C.N. Yang Research Scholarship**  
*University of Wisconsin-Madison*

10/2016

## Projects

### Google Summer of Code (GSoC)

*Mentee of the project "Quantum Machine Learning for High Energy Physics Application"* Jun. 2020 – Aug. 2020

- Developed a python module (called “quple”) for implementing the Variation Quantum Classifier (VQC) and the Quantum Support Vector Machine (QSVM) algorithms to solve the signal and background classification problem in the  $H \rightarrow \mu\mu$  and  $H \rightarrow t\bar{t}$  LHC analyses which achieved performance comparable to their classical analogues (paper pending)

### Yandex School of Data Analysis

*Participant of Fifth Machine Learning in High Energy Physics Summer School* Hamburg, Germany  
Jun. 2019

- Participated in the machine learning competition to recover particle initial position and momentum in the LHCb calorimeter using a deep convolutional neural network

## Research Experience

### University of Wisconsin-Madison

*Graduate Student in the Wisconsin Physics ATLAS Group* United States  
Jun. 2019 – current

- Involved in the  $H \rightarrow \mu\mu$  analysis with contributions to event categorizations involving signal and background separation using the XGBoost decision tree model
- Developed a hyperparameter optimization framework (called “hpogrid”) that supports automatic parallelization and smart resource scheduling for the ATLAS collaboration using grid computing resources

### The Chinese University of Hong Kong

*Final Year Project Student in the CERN ATLAS Hong Kong Group* Hong Kong  
Aug. 2017 – Aug. 2018

- Performed measurements on the Beyond Standard Model (BSM) Higgs couplings in the framework of the Higgs Characterization Model
- Created normalized distributions of kinematic variables and performed likelihood fitting on the distributions of various discriminant observables sensitive to different SM Higgs boson production mechanisms

- Computed the expected exclusion limits on the heavy neutral MSSM (Minimal Supersymmetric Standard Model) Higgs bosons  $A/H$  decaying to a pair of top quarks in  $pp$  collisions with integrated luminosity of  $35.9\text{fb}^{-1}$  at  $\sqrt{s} = 13\text{ TeV}$  and extrapolated the result to higher luminosities
- Performed mass and width morphings on the signal distribution and evaluated higher order QCD correction factors to the signal cross section using the MadGraph and SusHi event generators

## Teaching Experience

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**Physics 208 - General Physics (Modern Physics)**

*Teaching Assistant*

University of Wisconsin-Madison

*Fall 2018*

**Physics 201 - General Physics (Kinematics)**

*Teaching Assistant*

University of Wisconsin-Madison

*Spring 2019*

**Physics 202 - General Physics (Electricity and Magnitism)**

*Teaching Assistant*

University of Wisconsin-Madison

*Fall 2019*

## Technical Skills

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**Programming Languages:** Python, C/C++, ROOT, Bash, Pascal, Assembly

**Softwares:** Docker, LaTeX, Git, Qt, CORSIKA, AutoCad, Adobe Photoshop

**Operating Systems:** Windows, Linux