

# CURRICULUM VITAE OF SHAOKAI YANG

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## CURRENT POSITION

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**University of Cincinnati**  
Visiting Research Scholar

*September 2019 - Present*

Focusing on developing machine learning algorithms to maximum extract physics signals from data taken by particle imaging detectors.

## EDUCATION

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**University of Cincinnati**  
Ph.D., High Energy Experimental Physics

*2011 - 2019*

Dissertation: Searching for Light Sterile Neutrinos with NOvA Through Neutral-Current Disappearance

**Chinese Academy of Sciences**  
M. S., Particle Physics Phenomenology

*2007 - 2011*

Dissertation: Study on Some Charmless Hadronic B Decays

## RESEARCH EXPERIENCE

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**University of Cincinnati**

*2013 - 2019*

Graduate Researcher, Advisor: Prof. Alexandre Sousa

To perform the neutral current (NC) neutrino disappearance analyses and NOvA test beam constructing:

- Nus16 Official Analysis (2014 - 2016):  
As one of the main contributors, I participated to build the analysis framework and produce the first analysis result;
- Nus17 Official Analysis (2016 - 2017):  
My mainly contribution is to produce the NC-Dedicated Cosmic Rejection Particle Identification (PID) which is now applying by all NC-related analyses;
- Nus17 Re-Analysis (2017 - 2019):  
Obtained a strongly improved analysis result by employing advanced machine learning techniques;
- NOvA Test Beam Constructing (2014 - 2015):  
Accomplished the PVC tubes painting and leak test;

**Fermi National Accelerator Laboratory**

*2013 - 2017*

Graduate Researcher, Advisor: Dr. Ting Miao

Detector Constructing and Maintenance:

- Near Detector (ND) construction;
- ND readout electronics maintenance (serviced as Cooling and Dry Gas On-call expert);

**Google & CERN**

*May 2017 - August 2017*

Google Summer of Code Intern, Advisor: Dr. Sergei Gleyzer

Toolkit for Multivariate (TMVA) framework development

- Integrating TensorFlow into TMVA

**Chinese Academy of Sciences**

*2008 - 2011*

Graduate Researcher, Advisor: Prof. Deshan Yang

Charmless Hadronic B Decays Study:

- Calculated the branching ratio for  $B \rightarrow TP$  and  $B \rightarrow TV$  based on QCD Factorization;

- Focused on the large charge asymmetry in  $\bar{B} \rightarrow \bar{K}_2^* \omega$  observed by the BaBar collaboration;
- Calculated the  $\text{Br}(\bar{B}^0 \rightarrow a_2(1320^-)\pi^+)$  and  $\text{Br}(\bar{B}^0 \rightarrow a_2(1320^-)\rho^+)$  by applying the tensor emission contribution which extracted from the  $\text{Br}(\bar{B} \rightarrow \bar{K}_2^*(1430)\omega)$  based on the experimental data.

## TEACHING AND ADVISING EXPERIENCE

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### University of Cincinnati

Classical Mechanics teaching assistant

Spring 2012

College Physics Advisor

Summer 2011

### Chinese Academy of Sciences

Quantum Field Theory II teaching assistant

Summer 2009

Group Theory I teaching assistant

Spring 2008

## LEADERSHIP EXPERIENCE

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### Fermilab's NOvA experiment

TMVA-based Particle Identification (PID) Training group

2016 – 2017

Participated in planning and administering multi analyses PIDs training.

## SELECTED PUBLICATIONS

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1. **Search for active-sterile neutrino mixing using neutral-current interactions in NOvA**  
NOvA Collaboration, Published in *Phys. Rev. D* 96 no.7, 072006, 2017.
2. **Measurement of the neutrino mixing angle  $\theta_{23}$  in NOvA**  
NOvA Collaboration, Published in *Phys. Rev. Lett.* 118, 151802, 2017.
3. **First measurement of electron neutrino appearance in NOvA**  
NOvA Collaboration, Published in *Phys. Rev. Lett.* 116, 151806, 2016.
4. **Charge asymmetry in  $B \rightarrow K_2^*(1430) \omega$  and its implication in  $B^0 \rightarrow a_2^-(1320)\pi^+$  and  $a_2^-(1320)\rho^+$** , Deshan Yang, Shaokai Yang, Published in *Journal of the Graduate School of the Chinese Academy of Sciences*, 2012,29(4):433-438, 2012.

## SELECTED PUBLIC PRESENTATIONS

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1. **Building a Bridge Between Raw Data and Discovery for NOvA's Sterile Neutrino Searches**  
Invited talk at National Energy Research Scientific Computing Center (NERSC)  
NERSC, Nov. 2019.
2. **Exploring Computing Methods for Improved Cosmic Background Rejection in NOvA's Sterile Neutrino Searches**  
For NOvA Collaboration, Seminar talk  
DPF 2017 Meeting, Fermilab, Aug. 2017.
3. **Sterile Neutrino Search through Neutral Current Disappearance in the NOvA Experiment**  
With S. Edayath for NOvA Collaboration, Poster,  
50th Annual Fermilab Users Meeting, Fermilab, Jun. 2017.
4. **Looking for Sterile Neutrinos with NOvA via Neutral-Current**  
For NOvA Collaboration, APS April Meeting, Seminar talk  
Washington, D.C., Jan. 2017.

5. **Search for active-sterile neutrino mixing using neutral-current interactions in NOvA**  
With G. Davis for NOvA Collaboration, Poster  
38th International Conference on High Energy Physics (ICHEP), Chicago, Aug. 2016
6. **Looking for Sterile Neutrinos with NOvA**  
For NOvA Collaboration, DPF Meeting, Seminar talk  
University of Michigan, Aug. 2015.

## BOOKS

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[Deep Learning for Neutrino Physics](#)

## TECHNICAL STRENGTHS

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<b>Deep learning frameworks</b>	TensorFlow and PyTorch
<b>Operating systems</b>	Linux (Ubuntu), MacOS, and Windows
<b>Programming language</b>	C++, Python, and Julia
<b>Open-source software frameworks</b>	Hadoop and Spark
<b>Machine learning algorithms</b>	XGBoost, CatBoost, and LightGBM
<b>Automated machine learning frameworks</b>	Auto-sklearn, TPOT, and MLBox.

## LANGUAGES

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<b>Chinese</b>	Mother Tongue
<b>English</b>	Second Language

## HOBBIES

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Tennis, Soccer, Gardening, Xiangqi(Chinese chess), Go