

Yu Chen

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EDUCATION

- Huazhong University of Science and Technology** Wuhan, China
Master of electrical engineering; GPA: 3.85/4.00 (Top 30%)
Sep. 2022 - Jun. 2025
Courses: Advanced Engineering Electromagnetic Fields (96), Accelerator Physics (94), Applying Superconducting Technology (95), etc.
- Southwest University** Chongqing, China
Bachelor of electrical engineering; GPA: 4.30/5.00 (2/144)
Sep. 2018 - Jun. 2022
Courses: Complex Function (100), Linear Algebra (100), Advanced Math (98), Mathematical Statistics (98), High Voltage Technology (95), Automatic Control Principle (95), Steady State Analysis of Power System (94), Electrical Machinery (95), etc.

HONORS

- Chongqing Outstanding Graduates - May 2022
- Outstanding Graduates from Southwest University - May 2022
- Excellent Undergraduate Graduation Thesis in Chongqing - May 2022
- First Prize of Undergrad Thesis of Southwest University - May 2022
- Third Prize for Excellent Paper at the Chongqing Electrical Engineering Annual Conference - Dec. 2021

RESEARCH EXPERIENCE

- Fault diagnosis of synchronous machine winding based on FRA** SWU
Mentor: Prof. Zhongyong Zhao Jun. 2020 - Oct. 2023
 - Understanding fault mechanisms through equivalent circuit models:** Propose a Gary box model and a high-frequency lumped parameter circuit model based on the state space and intelligent algorithms.
 - Create a winding short circuit dataset:** Build a man-made winding short circuit faults platform and conduct fault seeding experiments, including different short circuit faults, different degrees, and different locations. Then use various mathematical-statistical indicators to evaluate these data.
 - Understand data-driven winding faults detection:** Propose an explainable AI technology to guide data-based models and give some suggestions about applying FRA to synchronous machine winding short circuit fault diagnosis.
 - Propose intelligent fault diagnosis methods for solving different problems:** 1. Propose an unsupervised anomaly detection method for a small unlabeled dataset. 2. Propose a data augmentation method for solving data shortage. 3. Propose a data-sample strategy based on active learning for reducing training time and computational power. 4. Propose a fault detection model with lifelong learning.
- Modeling, optimization, and intelligent control of HUST-PTF beamline** HUST
Mentor: Prof. Bin Qin Aug. 2022 - Current
 - Develop control programs for energy selection section:** Develop upper monitor and lower computer programs for controlling the energy degrader, multiple collimators, and energy slit.
 - Evaluate the existing beamline design:** Propose a start-to-end model for precisely evaluating beam properties.
 - Optimize the existing beamline design:** Propose an efficient optimization method for improving beam properties.
 - Developing an intelligent tuning program (Currently attempting):** Try to use reinforcement learning to build an intelligent decision-making model to control the facility.

SELECTIVE PUBLICATIONS

- Zhongyong Zhao*, Yu Chen, *et al.*, Evaluation of Operating State for Smart Electricity Meters Based on Transformer-Encoder-BiLSTM, *IEEE Trans. Industr. Inform.*, 2023
- Yu Chen, Zhongyong Zhao*, *et al.*, Application of Generative AI-based Data Augmentation Technique in Transformer Winding Deformation Fault Diagnosis, *Eng. Fail. Anal.*, 2024
- Yu Chen, Zhongyong Zhao*, *et al.*, Improved Interpretation of Impulse Frequency Response Analysis for Synchronous Machine Using Life Long Learning Based on iCaRL, *IEEE Trans. Instrum. Meas.*, 2023
- Yu Chen, Zhongyong Zhao*, *et al.*, Understanding IFRA for Detecting Synchronous Machine Winding Short Circuit Faults Based on Image Classification and Smooth Grad-CAM++, *IEEE Sens. J.*, 2023
- Yu Chen, Zhongyong Zhao*, *et al.*, Fault Anomaly Detection of Synchronous Machine Winding based on Isolation Forest and Impulse Frequency Response Analysis, *Measurement*, 2022
- Zhongyong Zhao*, Yu Chen, *et al.*, Equivalent Broadband Electrical Circuit of Synchronous Machine Winding for Frequency Response Analysis based on Gray Box Model, *IEEE Trans. Energy Convers.*, 2021
- Yu Chen, Xiaoqing Ji, Zhongyong Zhao*, *et al.*, Synchronous Machine Winding Modeling Method Based on Broadband Characteristics, *Appl. Sci.*, 2021
- Zhongyong Zhao*, Yu Chen, *et al.*, Analysis of Influencing Factors of 10 kV Dry Type Iron Core Series Reactor Fault Based on Equivalent Circuit and Temperature Field Model (in Chinese), *Science Technology and Engineering*, 2021

- Yueqiang Yu, **Yu Chen**, Zhongyong Zhao*, *et al.*, **Detection Method of Stator Winding Short Circuit Fault of Synchronous Machine Based on CWT and CNN-BiLSTM (in Chinese)**, *High Voltage technology*, 2023
- Yueqiang Yu, Zhongyong Zhao*, **Yu Chen**, *et al.*, **Evaluation of the Applicability of IFRA for Short Circuit Fault Detection of Stator Windings in Synchronous Machines**, *IEEE Trans. Instrum. Meas.*, 2022
- Zhongyong Zhao*, Chao Tang, **Yu Chen**, *et al.*, **Analysis of Interpretation of Transformer Winding Deformation Fault by the Spectral Clustering of FRA Signature**, *Int. J. Electr. Power Energy Syst.*, 2021

CONFERENCES

- **Yu Chen**, Bin Qin*, *et al.*, High-fidelity Modeling and Transmission Optimization for the Beamline of HUST-PTF, The Symposium on Accelerator Physics, 2023
- Shubai Chen, Wu Song*, **Yu Chen**, *et al.*, Deep Similarity Preserving and Attention-based Hashing for Cross-Modal Retrieval, Proceedings of the International Conference on Software Engineering and Knowledge Engineering, 2021

WORKING MANUSCRIPT

- **Yu Chen**, Bin Qin*, *et al.*, Seamless modeling and transmission efficiency optimization for a proton therapy beamline, submitted to *Nucl. Sci. Tech.*, 2024
- **Yu Chen**, Zhongyong Zhao*, *et al.*, Intelligent FRA-guided Synchronous Machine Winding Short Circuit Faults Diagnosis Based on Active Learning, submitted to *IEEE Trans. Energy Convers.*, 2024

COMPETITIONS

- **National Undergraduate Electronics Design Contest (2022 National Second Prize)**: Signal distortion measurement device (in Chinese), **Yu Chen**, Xi Chen, Ziqi Liao, Advisor: Prof. Zhongyong Zhao.
- **National Plasma Science and Technology Innovation Competition of College Students (2022 National Second Prize)**: Plasma-based wastewater treatment plant (in Chinese), Haodong Dai, Hao Gui, **Yu Chen**, Advisor: Prof. Zhongyong Zhao.
- **Challenge Cup Extracurricular Academic Works of Science and Technology (2021 Excellence Award)**: Nanosecond Fault Detector - The Doctor of Large Synchronous Machine (in Chinese), Yueqiang Yu, Mengyuan Han, **Yu Chen**, *et al.*, Advisor: Prof. Zhongyong Zhao.
- **Challenge Cup Extracurricular Academic Works of Science and Technology (2021 First Prize in Chongqing)**: Study on the Promoting Effect of “Two Mountains” Theory on Rural Revitalization –Survey on the sense of access of 127 villagers in Anji Yu Village (in Chinese), Xinru Li, Xintong Wang, **Yu Chen**, *et al.*
- **Mathematical Contest in Modeling (2021 Meritorious Winner)**: A Model for Evaluating and Optimizing High Education (in Chinese), **Yu Chen**, Shubai Chen, Zehua Cao, Advisor: Prof. Zhongyong Zhao.
- **National Undergraduate Mathematical Contest in Modeling (2020 First Prize in Chongqing)**: Credit Decision Optimization Model Based on TOPSIS and KMV Model (in Chinese), **Yu Chen**, Shubai Chen, Zehua Cao, Advisor: Prof. Zichuan Fan.
- **National Undergraduate Mathematics Competition (2020 First Prize in Chongqing)**: **Yu Chen**.

INTERNSHIP EXPERIENCE

- **Hunan Huishiwei Intelligent Technology Co., Ltd** Hunan, China
Algorithm engineer (Full-time) *Jun. 2022 - Aug 2022*
 - **Developing License Plate Recognition Models**: Responsible for object detection modeling and image transformation techniques.
 - **Developing an automated car counting model.**: Responsible for object detection modeling.

SKILLS SUMMARY

- **Programmings**: Python, Matlab, LabVIEW, C++, C
- **Frameworks**: Torch, Keras, Ax-platforms, SciPy, Optimization algorithm, Avalanche, Torchcam
- **Tools**: Simulink, Docker, Multisim, Latex, PSpice, BDSIM, Altium designer, Linux, Windows
- **Interests**: Fault diagnosis, System identification and modeling, System optimization, Optimal control, Signal process
- **Technologies**: Data augmentation, Anomaly detection, Lifelong learning, Reinforcement learning, Active learning

SCHOLARSHIPS

- Second Prize Zhixing Scholarship - Sept. 2023
- First Prize Master Academic Scholarship of HUST - Sept. 2023
- First Prize Master Academic Scholarship of HUST - Sept. 2022
- Scholarship for Gratitude to Modern Scientists (Only **12** students per year) - May 2022
- Tang Lixin Excellent Learning Pioneer (Only **12** students per year) - Oct. 2021
- **Chinese National Scholarship** - Sept. 2021
- First Prize Scholarship of Southwest University - Sep. 2020
- **Chinese National Scholarship** - Sept. 2019