

Chenxi Hu

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Department of Electrical and Electronic Engineering
The University of Hong Kong

EDUCATION

The University of Hong Kong

Sept. 2021 - present

Ph.D. in Electrical Engineering (*HKU Presidential PhD Scholarship*)

Supervisor: Dr. Yunhe Hou / **Co-Supervisor:** Prof. K.T. Chau

Wuhan University

Sept. 2016 - Jun. 2020

Major: B.E. in Electrical Engineering / **Minor:** Finance

GPA: 3.94/4.0

RESEARCH INTERESTS

Resilient Planning of Renewable-dominated Power Systems

Decision-Dependent Uncertainties Modelling and Quantification

Reinforcement Learning and Its Applications in Renewable Energy Systems

EXPERIENCE

Gangke Smart Power Holding Group Co., Ltd, Guangzhou, China

Mar. 2023 - present

Technical Consultant

Wuhan University, Wuhan, China

Jul. 2020 - Aug. 2021

Research Assistant

Ant Group, Shanghai, China

May 2021 - Aug. 2021

Software Engineer Intern

University of California, Los Angeles, Los Angeles, U.S.

Jul. 2019 - Sep. 2019

Research Intern, The Cross-disciplinary Scholars in Science and Technology (CSST) Program

New York University, Shanghai, Shanghai, China

Jun. 2018 - Aug. 2018

Research Intern, The NYU Shanghai Summer Undergraduate Research Program (SURP)

PROJECT PARTICIPATION

Risk-informed Resilient Planning of Power System

2023 - present

Leading Researcher

The University of Hong Kong

- Construct a risk-informed resilient-oriented planning model for transmission systems by leveraging predictive information.
- Address the decision-dependent uncertainty and the predictive information uncertainty of the extreme weather events using a decision-dependent stochastic programming method.

Constructing the Steady-state Security Region of Power System

2021 - present

Leading Researcher

The University of Hong Kong

- Construct the DC power flow-based security region for the security assessment of renewable energy.
- Construct the security region of AC power flow based on the Brouwer fixed-point theorem.
- Derived the explicit condition ensuring the existence of decoupled AC power flow solutions and estimate the error for the resulting security region.

Enhancing Resilience of Grid-Interactive Efficient Buildings Against Heat Waves Using Reinforcement Learning

2023 - present

Major Researcher

The University of Hong Kong

- Develop an online resilience-oriented energy management method for the grid-interactive efficient building clusters via reinforcement learning.

Development of the Integrated Energy Management Platform for Fast EV Charging Facilities

2023 – 2026

Major Researcher

Innovation and Technology Fund (ITF) of Hong Kong

- Develop AI-based forecasting methods to predict grid-side available capacity and EV charging demand.

Bidding Strategy for Energy Storage Systems Utilizing AI-Based Forecast of Renewables and Electricity Prices

2023 – 2026

Technical Consultant

Gangke Smart Power Holding Group Co., Limited

- Construct forecasting models for renewable energy and electricity prices using long short-term memory networks.
- Develop game-theoretic bidding strategies to optimize revenue for energy storage systems in balancing and ancillary service markets.

The Source-Network-Load-Storage Integrated Scheduling Model

2023

Major Researcher

State Grid Corporation of China

- Analyze Multi-time scale operation and complementary characteristics of the source, grid, load, and storage, considering large-scale energy storage.
- Construct an operation model of the integrated hydrogen energy system.

Small-sample Transfer Learning Framework for Black Swan Events

Dec. 2020 – May 2022

Leading Researcher

Wuhan University

- Establish a transfer learning framework to address black swan events with limited data.
- Construct a mid-term load forecasting model for Central and Eastern China during the COVID-19 using convolutional neural networks.

Dynamic Characteristics Analysis of Central China's Socio-economic Structure and Electricity Market based on Social Computing and Artificial Intelligence

Oct. 2019 – Dec. 2020

Major Researcher

State Grid Corporation of China

- Construct a mid-term load forecasting model based on deep belief network using the economic and electricity data in China.
- Constructed a mixed-frequency load forecasting model using Long short-term memory network.

Physics-based Neuron Network

Jul. 2019 – Sep. 2019

Student Researcher

University of California, Los Angeles

- Integrate physical models with the neural network to improve the performance of multiple tracking algorithms.

PUBLICATION

Journal Papers

- J1 **Chenxi Hu**, Jun Zhang, Hongxia Yuan, Tianlu Gao, Huaiguang Jiang, Jing Yan, David Wenzhong Gao, and Fei-Yue Wang, "Black swan event small-sample transfer learning (BEST-L) and its case study on electrical power prediction in COVID-19." *Applied Energy*, vol. 309:118458, 2022.
- J2 Yujia Li, Shunbo Lei, Wei Sun, **Chenxi Hu** and Yunhe Hou, "A Distributionally Robust Resilience Enhancement Strategy for Active Distribution Networks Considering Decision-dependent Contingencies," submitted to *IEEE Transactions on Smart Grid*, 2023. (Accepted).

Conference Papers

- C1 **Chenxi Hu**, Jiazuo Hou and Yunhe Hou, “Security Assessment of Power System with Stochastic Uncertainty Based on Steady-state Controllable Distance,” *2022 IEEE PES Innovative Smart Grid Technologies - Asia (ISGT-Asia)*, 2022, pp. 434-438.
- C2 **Chenxi Hu**, Hongxia Yuan, Jun Zhang, et al. “Mid-Long Term Electricity Consumption Forecasting Analysis Based on Cyber-Physical-Social System Architecture,” *16th International Conference on Automation Science and Engineering (CASE)*, Hong Kong, China, 2020, pp. 564-569.
- C3 Yujia Li, **Chenxi Hu**, and Yunhe Hou, “The Value of Ambiguity Quantification in Distributionally Robust Economic Dispatch Models for the Wind-Penetrated Power System,” *2023 IEEE PES Generation Transmission and Distribution Conference & Exposition Asia*, 2023. (Accepted)

In-progress Journal Papers

- J1 **Chenxi Hu**, Yujia Li, and Yunhe Hou, “Risk-informed Resilience Enhancement of Transmission Grids Against Ice Storms.”

INVITED TALKS

- T1 October 2023, “Risk-Informed Resilience Enhancement of Transmission Grids Against Ice Storms”, *2023 INFORMS Annual Meeting*, Phoenix, U.S. (Upcoming)
- T2 October 2022, “Information-theoretic Method in Power System”, *2022 INFORMS Annual Meeting*, Indianapolis, U.S.
- T3 October 2022, “Security Assessment of Power System with Stochastic Uncertainty Based on Steady-state Controllable Distance”, *2022 IEEE Innovative Smart Grid Technologies - Asia*, Singapore.

SKILLS

Programming Languages and Frameworks

- Proficient in using Python, Julia, MATLAB/Simulink; Experienced in C
- Skilled with optimization solvers (Gurobi, CPLEX, Mosek etc.)

TEACHING EXPERIENCE

- **Power system analysis and control**, Teaching Assistant, 2023/2024
- **Power Systems Capstone Workshop**, Teaching Assistant, 2024

AWARDS AND SCHOLARSHIPS

- **HKU Presidential PhD Scholarship** *Sep. 2021*
Awarded by the University of Hong Kong
- **Outstanding Graduate** *Jun. 2020*
Awarded by Wuhan University
- **The Ultra High Voltage(UHV) Scholarship** *Nov. 2019*
Awarded by the State Grid Corporation of China
- **The Cross-disciplinary Scholars in Science and Technology Scholarship** *Jun. 2019*
Awarded by the University of California, Los Angeles
- **National Scholarship (Top 2%)** *Nov. 2018*
Awarded by the Chinese Ministry of Education
- **Wuhan University First-class Scholarship** *Nov. 2018*
Awarded by Wuhan University

- **National Scholarship (Top 2%)**
Awarded by the Chinese Ministry of Education
- **Wuhan University Freshman Scholarship**
Awarded by Wuhan University

Nov. 2017

Sep. 2016