Chenxi Hu

E-mail: cxhu@eee.hku.hk Department of Electrical and Electronic Engineering The University of Hong Kong

EDUCATION	
The University of Hong Kong Ph.D. candidate in Electrical Engineering (<i>HKU Presidential PhD Scholarship</i> Supervisor: Prof. Yunhe Hou / Co-Supervisor: Prof. K.T. Chau	Sept.2021 - present)
Wuhan University	Sept. 2016 - Jun. 2020
Major: B.E. in Electrical Engineering and Its Automation/ Minor: Finance	GPA: 3.94/4.0
RESEARCH INTERESTS	
Resilient Planning of Renewable-dominated Power System	
Decision-Dependent Uncertainty Modelling and Quantification	
Machine Learning and Its Applications in Renewable Energy Systems	
EXPERIENCE	
Gangke Smart Power Holding Group Co., Ltd, Guangzhou, China Technical Consultant	Mar. 2023 - present
Ant Financial , Shanghai, China Software Engineer Intern	May 2021 – Aug. 2021
University of California, Los Angeles , Los Angeles, U.S. Research Intern, The Cross-disciplinary Scholars in Science and Technology (C	Jul. 2019 – Sep. 2019 SST) Program
New York University, Shanghai , Shanghai, China Research Intern, The NYU Shanghai Summer Undergraduate Research Progra	Jun. 2018 – Aug. 2018 m (SURP)

RESEARCH PROJECT

Distributionally Robust Resilience Enhancement Strategy Against Ice Storms Considering Decision-Dependent Line Availability Uncertainty Dec. 2023 – present

- Proposed a novel proactive network reconfiguration model to schedule power flows so as to reduce the glaze icing on power lines.
- Proposed a novel moment-based ambiguity set that simultaneously incorporates the relationship of line failure probabilities with both weather conditions (exogenous) and power flows (endogenous).
- Employed a parameterized column-and-constraint generation (C&CG) algorithm to effectively solve the established two-stage Robust Optimization with Decision Dependent Uncertainty.

Risk-informed Resilience Planning of Transmission Systems Against Ice Storms

Mar. 2023 – Dec. 2023

- Developed a risk-informed resilient planning model by leveraging predictive information, emphasizing line hardening and energy storage siting and sizing decisions.
- Modelled and quantified the endogenous uncertainty of the predictive information, decision-dependent uncertainty from planning decisions and exogenous uncertainty from dispatchable resources.
- Employed the progressive hedging algorithm (PHA) to solve the large-scale mixed-integer linear programming problem.

Constructing the Steady-state Security Region of Power System Sep. 2021 – Dec. 2022

- Constructed the DC power flow-based security region for the security assessment of renewable energy.
- Constructed 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 May. 2023 – present

• Developed an online resilience-oriented energy management method for the grid-interactive efficient building clusters via the Proximal Policy Optimization Algorithm.

Small-sample Transfer Learning Framework for Black Swan Events Dec. 2020 - May 2022

- Established a transfer learning framework to address black swan events with limited data.
- Constructed 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

- Constructed 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.

PUBLICATION

Journal Papers

- J1 Chenxi Hu, Yujia Li, and Yunhe Hou, "Risk-informed Resilience Planning of Transmission Grids Against Ice Storms." (Submitted to *IEEE Transactions on Power System*)
- J2 Chenxi Hu, Jun Zhang, et al, "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.
- J3 Jiazuo Hou, Chenxi Hu, Shunbo Lei, Liang Liang, and Yunhe Hou, "Security region of inverterinterfaced power systems: Existence, expansion, and application." *Renewable and Sustainable Energy Reviews*, 192, p.114222, 2024.
- J4 Jiazuo Hou, Chenxi Hu, Shunbo Lei, and Yunhe Hou, "Cyber resilience of power electronicsenabled power systems: A review." *Renewable and Sustainable Energy Reviews*, 189, p.114036, 2024.
- J5 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," *IEEE Transactions on Smart Grid*, doi: 10.1109/TSG.2023.3310979, 2023.

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 GTD International Conference and Exposition (GTD), 2023.

INVITED TALKS

- T1 October 2023, "Risk-Informed Resilience Enhancement of Transmission Grids Against Ice Storms", 2023 INFORMS Annual Meeting, Phoenix, U.S.
- T2 July 2023, "Enhancing Resilience of Grid-Interactive Efficient Buildings Using Reinforcement Learning", *IEEE PES General Meeting*, Orlando, U.S.
- T3 October 2022, "Information-theoretic Method in Power System", 2022 INFORMS Annual Meeting, Indianapolis, U.S.
- T4 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
- 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 Awarded by the University of Hong Kong	Sep. 2021
• Outstanding Graduate Awarded by Wuhan University	Jun. 2020
• The Ultra High Voltage(UHV) Scholarship Awarded by the State Grid Corporation of China	Nov. 2019
• The Cross-disciplinary Scholars in Science and Technology Scholarship Awarded by the University of California, Los Angeles	Jun. 2019
• National Scholarship (Top 2%) Awarded by the Chinese Ministry of Education	Nov. 2018
• Wuhan University First-class Scholarship Awarded by Wuhan University	Nov. 2018
• National Scholarship (Top 2%) Awarded by the Chinese Ministry of Education	Nov. 2017
• Wuhan University Freshman Scholarship Awarded by Wuhan University	Sep. 2016