Xun Jiang

Education

10.2019 – 08.2024 **PhD in Electrical Engineering, Cardiff University, UK**

- Thesis: "Feasible operation region of an electricity distribution network with soft open points"
- Supervisor: Prof. Jianzhong Wu, Dr. Wenlong Ming, Dr. Yue Zhou, Prof. Janaka Ekanayake.
- Established the **feasible operation region** (FOR) methodology for accurately assessing the hosting capacity of electricity distribution networks; Applied FOR methodology in both **characterising the hosting capacity and constraint management of the network with soft open points (SOPs)**.

09.2016 – 01.2019 **MSc in Electrical Engineering, Tianjin University, China**

- Thesis: "Locating and sizing of partition flexible interconnection devices in urban power grids".
- Supervisor: Prof. Jun Xiao.
- **Outstanding Graduate Award** of Tianjin University for Masters.

09.2012 – 07.2016 **BEng in Electrical Engineering, Tianjin University, China**

- Thesis: "Capacity dimensioning method of partition flexible interconnection devices in urban power grids".
- Supervisor: Prof. Jun Xiao.
- **Outstanding Graduate Award** of Tianjin University for Undergraduates

Work and Project Experience

04. 2024 – present **Research Associate at Cardiff University, UK**

Projects undertook:

- EPSRC *Supergen Energy Networks Impact Hub* project, UK.
  - Investigate in using feasible operation region (FOR) method for evaluation of the connection and operation of low carbon technologies (LCTs).
  - Develop strategies to combine LCT connection requests to reduce the connection queue problem.
- *FlexCHESS* project, Europe.
  - Evaluate hosting capacity of electric power networks.
  - Quantify and utilise the flexibility from various components of electric power systems including SOPs and hybrid/virtual energy storage systems.

02.2021 – 10. 2024 **Researcher**, EPSRC *Supergen Energy Networks Hub* project, UK.

- ***Feasible operation region of an electricity distribution network***
  - Developed a noval FOR method to describe **the overall picture of the capability of a distribution network** to integrate generation and demand.
  - Proposed quadratic expressions for both thermal and voltage boundaries of FOR, which outperform the existing linear expressions.
  - Provided a general high-dimensional error analysis approach for validation.
  - Published in *Applied Energy* and a top conference paper.
- ***Feasible Operation Region of a Distribution Network with SOPs***
  - Established a noval Minkowski Sum model for expressing the impact of SOPs on the FOR of a distribution network.
  - Developed a practical Minkowski Sum algorithm to derive the analytical expressions of the boundaries of FOR of a network with SOPs.
  - The model can be extended to formulate the FOR of distribution networks with different types of power electronics devices or flexible power sources.
  - To be submitted to *IEEE Transactions on Smart Grid*.
- ***Feasible Operation Region-based Constraint Management of Distribution Networks with SOPs***
  - Developed a novel FOR-based method for optimal constraint management of distribution networks using SOPs, which can adapt to various measurement conditions.
  - Compared the performance of the FOR-based method with that of local control and optimal power flow-based control.
  - The method can be extended for constraint management with different types of power electronics devices or flexible power sources.
  - To be submitted to *IEEE Transactions on Smart Grid*.

10.2019 – 09.2023 **Researcher**, EPSRC UK-China *MC2* project, UK.

- ***Optimal operation of SOPs to minimise energy curtailment*** *of distributed generation in electricity distribution networks*
  - Established the optimisation model for the SOP control which targets at minimising the energy curtailment of distributed generation.
  - Evaluated the impact of the uncertainties of power loading on the SOP performance through Monte Carlo simulation.
  - Analysed the impact of location, capacity and number of SOPs on the performance of energy curtailment.
  - Published in a top conference paper.
- ***An Overview of SOPs in Electricity Distribution Networks***
  - Provided a comprehensive overview of academic research on SOPs, including the topologies, benefit quantification, control, and optimal siting and sizing of SOPs.
  - Summarised the industrial practice of SOPs worldwide.
  - Published in *IEEE Transactions on Smart Grid***.**

10.2015 – 01.2019 **Student leader and researcher**, the National 863 Program of China, China

- ***Benefit analysis of SOPs in high-voltage power distribution networks in Beijing***
  - Established the model of total power supply capacity (TSC) considering steady-state security and transient voltage stability of the power network.
  - Evaluated the benefits of SOPs on increasing the hosting capacity of power load (i.e., TSC) in the urban power grid in the Beijing pilot project.
- ***Optimal siting and sizing of SOPs in high-voltage power distribution networks in Beijing***
  - Developed a practical three-stage siting and sizing method that include an indices-based initial selection stage, an optimisation stage for siting of SOPs, and a stage to determine the capacity of SOPs.
  - Implemented the proposed three-stage method in the Beijing pilot project.
- *The supplementary provision in the code of planning and design of urban electric network*
  - Published planning guidelines on AC/DC hybrid distribution networks according to the project practice;

07.2016 – 01.2019 **Researcher**, the National Key Research and Development Program of China, China

- *Distribution Network Planning Methods Considering Flexible Loads with High Renewable Penetration*
  - Investigated the operation modes of flexible distribution networks with distributed energy resources;
  - Compared the configurations of flexible distribution networks with conventional distribution networks and analysed the advantages of flexible distribution networks;

Involvement with CIGRE Activities

1. Led the CIGRE UK NGN Young Member (YM) Showcase Competition, 2025
2. Served as a reviewer for the abstracts and full papers in the CIGRE UK NGN YM Showcase Competition, 2025
3. Delivered a keynote presentation in the CIGRE UK NAN AGM, Nov. 2025
4. Volunteered the NESO visit, Aug. 2025
5. Served as a mentor within CIGRE UK mentoring scheme, 2025-2026
6. Attended CIGRE UK Annual General Meeting (AGM) and CIGRE UK NGN AGM, Nov. 2025

Involvement with Other Activities

1. Led the establishment of the IEEE Student Branch and Student Branch Chapter at Cardiff University, 2025
2. Coorganised the IEEE PELS Day event, 2025
3. Volunteered in the 2nd IEEE Workshop on Wide Bandgap Power Devices & Applications in Europe, UK, Sept. 2024
4. Published an online video on the topic of "UK pilot site—Virtual Energy Storage System for Industrial Buildings" within the Horizon Europe project FlexCHESS.
5. Volunteered in organising "2023 UK-China Workshop and YESS Programme on Electrical Technology and Energy Equipment", Cardiff, UK, Oct. 2023.
6. Presented "Soft Open Points in Medium Voltage Distribution Networks" on a research seminar for a group of undergraduates from Zaporizhzhia Polytechnic National University of Ukraine, Sept. 2023.
7. Volunteered in the 15th "Energy Innovation Youth Forum" hosted online by Chinese Society for Electrical Engineering, China, May 2023.

Leadership and Reputation

2025	**Students & Young Professonals Representative** of IEEE PELS UK & I Section Chapter
2025-present	**Committee member** of CIGRE UK NGN
2024	**Technical session chair** of "Key Supporting Technologies for New Power Systems" (IEEE EI2), China
2022-present	**Committee member** of international student committee of the global PhD conference "Engineering for Carbon Zero" for University Consortium on Engineering Education and Research (UCEER-ECZ), UK
2022	**Session chair** of "Distributed Energy System and Energy Management" in UCEER-ECZ conference in 2022, UK
2021 – Present	**Member** of the CIGRE UK NGN
2015 – 2019	**Student leader** of WP1 of the National 863 Program of China

Academic Supervision

2022 – 2023	Co-supervise 1 MSc student at Tianjin University, China on "Decoupling and Dimension Reduction Method for Distribution System Security Region". – **1 joint journal** published in *IET Energy Systems Integration*.
2021	Co-supervise 1 MSc student at Cardiff University, UK on "Electricity Load Forecasting Models for a Hospital Site". – Graduated.

Awards

1. ESI Highly Cited paper (First author);
2. IEEE WIPDA Europe Outstanding Poster Award, UK, 2024
3. Chinese Excellent Thesis Award for Master's Degree, China, 2020.
4. 7 scholarships, Tianjin University, China, 2012-2019.
5. Outstanding Graduate Student for Masters, Tianjin University, China, 2019.
6. Excellent Paper Award, Power System Technology (EI journal in Chinese), 2018.
7. Outstanding Graduate Student for Undergraduates, Tianjin University, China, 2016.

Reviewing Activities

2019 – Present	Reviewer of journal papers in IEEE Transactions on Smart Grid, IEEE Transactions on Power Systems, Applied Energy, CSEE Journal of Power and Energy Systems, IEEE Access, IET Renewable Power Generation, Energy Engineering, etc.

Peer-reviewed Journal Papers

1. **X. Jiang**, J. Wu, Y. Zhou. "Modelling Feasible Operation Region of a Distribution Network via a Data Driven Approach," ***CSEE JPES***. (Under review)
2. J. Xiao, L. Xue, **X. Jiang**, C. Wang., H. Liang, and K. Wang, "The total accommodation capability curve for a distribution network considering N-1 criterion. Electric Power Systems Research," ***Electr. Power Syst. Res***. 2025.
3. **X. Jiang**, Y. Zhou, J. Wu, W. Ming, "Feasible operation region of a distribution network with soft open points," ***IEEE Trans. Smart Grid***. (Under review)
4. **X. Jiang**, Y. Zhou, J. Wu, W. Ming, "Feasible operation region-based constraint management of distribution networks with soft open points," ***IEEE Trans. Power Systems***. 2025.
5. G. Zu, Y. Wang, **X. Jiang**, Z. Hao, X. Zhang, "Total supply capability of electricity distribution networks considering flexible interconnection of low-voltage service transformers," ***IET Smart Grid***, 2024.
6. **X. Jiang**, Y. Zhou, W. Ming, and J. Wu, "Feasible operation region of an electricity distribution network," ***Appl. Energy***, vol. 331, no. 120419, 2023.
7. J. Xiao, Y. Fan, and **X. Jiang**, "Decoupling and dimension reduction method for distribution system security region," ***IET Energy Syst. Integr.***, vol. 5, no. 3, pp. 338–354, 2023.
8. **X. Jiang**, Y. Zhou, W. Ming, P. Yang, and J. Wu, "An Overview of Soft Open Points in Electricity Distribution Networks," ***IEEE Trans. Smart Grid***, vol. 13, no. 3, pp. 1899–1910, 2022.
9. J. Xiao, G. Zu, Y. Wang, X. Zhang, and **X. Jiang**, "Model and observation of dispatchable region for flexible distribution network," ***Appl. Energy***, vol. 261, 2020.
10. **X. Jiang**, J. Xiao, B. She, and G. Zu, "Locating and sizing of partition flexible interconnection converter station in large urban power grids," ***IET Gener. Transm. Distrib.***, vol. 13, no. 21, pp. 4830–4841, 2019.
11. J. Xiao, Y. Wang, F. Luo, L. Bai, F. Gang, R. Huang, **X. Jiang**, et al., "Flexible distribution network: Definition, configuration, operation, and pilot project," ***IET Gener. Transm. Distrib.***, vol. 12, no. 20, pp. 4492–4498, 2018.
12. J. Xiao, L. Yi, L. Bai, C. Yin, R. Huang, **X. Jiang**, et al., "Key technologies for flexible interconnection in urban power grid and pilot demonstration," ***Int. Trans. Electr. Energy Syst.***, vol. 28, no. 8, pp. 1–21, 2018.
13. J. Xiao, **X. Jiang**, W. Guo, Y. Li, R. Huang, and P. Chen, "Total Power-supply Capability of Urban Power Grid with Flexibly-

interconnected Partitions," ***Electr. Power Autom. Equip.***, vol. 37, no. 8, pp. 66–73, 2017. (**in Chinese EI journal**)

14. J. Xiao, **X. Jiang**, R. Huang, K. Zhang, B. Shu, and W. Guo, "Capacity Dimensioning Method of Partitioned Flexible Interconnection Device in Urban Power Network," ***Autom. Electr. Power Syst.***, vol. 42, no. 02, pp. 99–105, 2018. (**in Chinese EI journal)**
15. C. Yin, J. Zhu, **X. Jiang**, N. Yang, Q. Chang, and J. Xiao, "Multi-terminal Flexible Closed-loop Medium Voltage Distribution Network Demonstration Project," ***Proc. CSU-EPSA***, vol. 31, no. 02, pp. 66–73, 2018. (**in Chinese CSCD Journal**)
16. J. Xiao, F. Gang, **X. Jiang**, R. Huang, T. Wei, and W. Zhang, "Flexible Distribution Network: Definition, Morphology and Operation Mode," ***Power Syst. Technol.***, vol. 41, no. 05, pp. 1435–1446, 2017. (**in Chinese EI journal**)

Conference Papers

1. Zhiwei Lin, Y. Zhou*, **X. Jiang**, W. Gan, W. Zhou, J. Wu, " Optimal Planning of Distribution Network Access for Deferring Network Reinforcement", 2026 IEEE PES General Meeting, Austin, Texas, USA, Jul. 2025.
2. **X. Jiang**, Y. Zhou, J. Wu, "Modelling feasible operation region of an electricity distribution network: a hybrid simulation-analytical approach", *2024 IEEE Conference on Energy Internet and Energy System Integration (IEEE EI2),* Shenyang, China, Nov. 2024.
3. **X. Jiang**, Y. Wang, Y. Zhou and W. Ming, "Wide bandgap power electronic devices for constraint management in distribution networks", *2024 IEEE Workshop on Wide Bandgap Power Devices and Applications in Europe (WiPDA Europe)*, Cardiff, UK, Sept. 2024.
4. **X. Jiang**, J. Wu, Y. Zhou and W. Ming, "Feasible operation region of a distribution network considering thermal constraints", *Proceeding of the 13th international conference on applied energy (ICAE2021)*, Virtual/Thailand, Nov. 2021.
5. **X. Jiang**, W. Ming, Y. Zhou and J. Wu, "Optimal operation of soft open points to minimize energy curtailment of distributed generation in electricity distribution networks", *Proceedings of applied energy symposium 2020: Low carbon cities and urban energy systems (CUE2020)*, Virtual/Tokyo, Japan, Oct. 2020.

Patent

1. J. Xiao, **X. Jiang**, et al. A dimensioning method for VSC-HVDC based partitioned interconnecting device in urban power grid, CN201611117294.1, authorised. (Chinese Patent)
2. J. Xiao, W. Guo, **X. Jiang**, et al. A calculation method for the total power-supply capacity of 220kV partition in urban power grid, CN201610814890.9, authorised. (Chinese Patent)
3. J. Xiao, F. Gang, W. Guo, **X. Jiang**. A calculation method for total supply capability for flexible distribution network, CN201610974030.1, authorized. (Chinese Patent)

Links and Collaborations

- Imperial College London, Queen's University Belfast, etc., UK
- University of Tennessee, USA
- Tianjin University, Tsinghua University, Shanghai Jiao Tong University, China Electric Power Research Institute, State Grid Tianjin Electric Power Research Institute, etc., China