Yifan Zhou

CONTACT INFORMATION

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Stony Brook University
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RESEARCH INTERESTS

AI-Driven Smart Grids, Quantum Computing in Power Grids, Networked Microgrids, Power System Stability and Control, Formal Analysis, Multicarrier Energy Systems.

CURRENT APPOINTMENTS

Stony Brook University Sep. 2022 – Present

Assistant Professor in Department of Electrical and Computer Engineering.
(On maternity leave from June 2023 to December 2023)

PROFESSIONAL PREPARATION

Stony Brook University Sep. 2019 – Aug. 2022

Postdoc in Department of Electrical and Computer Engineering.
Advisor: Prof. Peng Zhang

Tsinghua University Sep. 2014 – Jul. 2019

Ph.D. in Electrical Engineering. GPA: 92.0/100, Rank: 5/58
Advisor: Prof. Yong Min.
Thesis: Integrated Power and Heat Dispatch Methodology Based on Operational Flexibility

Harvard University May. 2018 – Oct. 2018

Visiting Scholar in School of Engineering and Applied Sciences.
Advisor: Prof. Na Li

University of Birmingham Apr. 2016 – Jul. 2016

Visiting Scholar in Department of Electronic, Electrical and Systems Engineering.
Advisor: Prof. Xiao-Ping Zhang

Tsinghua University Sep. 2010 – Jul. 2014

B.S. in Electrical Engineering. GPA: 93.1/100, Rank: 1/132

PUBLICATIONS

Name: Students who I mentored or co-mentored. Name*: Corresponding author.

Pending

6. Yao Xiao, **Yifan Zhou***, "Low-Resolution Physics-Guided, High-Resolution Neural Simulator of Power Grids", *IEEE Transactions on Power Systems*, under 1st round review, Sep. 2024.
5. Sijia Yu, **Yifan Zhou***, "Expressive and Robust Quantum Neural Network for Real-Scale Power System Stability Analysis", *ACM Transactions on Quantum Computing*, under 1st round review, Sep. 2024.
4. Sijia Yu, **Yifan Zhou***, "Quantum Noise-Robust Power System Stability Assessment via Equivalent Noise Aggregation", *IEEE Transactions on Power Systems*, under 1st round review, Jun. 2024.
3. Xuguo Fu, **Yifan Zhou***, "Learning-Based, Runtime Reachability Analysis of Microgrid Dynamics", *IEEE Transactions on Power Systems*, under 2nd round review, Mar. 2024.

2. Trisha Sabadra (high school student), Sijia Yu, **Yifan Zhou***, "Quantum Kernel Classification for Data-Driven Power System Stability Assessment", *2024 IEEE International Conference on Big Data (IEEE BigData 2024) - Undergraduate and High School Symposium*, under preparation, to be submitted in Oct. 2024.
1. Asha Boyapati (high school student), Sijia Yu, **Yifan Zhou***, "Variational Quantum Regressor for Power System Transients Prediction", *2024 IEEE International Conference on Big Data (IEEE BigData 2024) - Undergraduate and High School Symposium*, under preparation, to be submitted in Oct. 2024.

Peer-Reviewed Journals

29. Fei Feng, **Yifan Zhou***, Peng Zhang, "Neuro Dynamic State Estimation for Networked Microgrids", *IEEE Transactions on Industry Applications*, accepted, Jan. 2024.
28. Qing Shen, **Yifan Zhou***, Peng Zhang, "Physics-Aware Neural Dynamic Equivalence of Power Systems", *IEEE Transactions on Power Systems*, accepted, Oct. 2023.
27. Zimin Jiang, Peng Zhang*, **Yifan Zhou**, "Differential Duffing Oscillator Based Cyberattack Detection for Inverters", *IEEE Transactions on Smart Grid*, accepted, Oct. 2023.
26. Lizhi Wang, Songyuan Zhang, **Yifan Zhou***, Chuchu Fan, Peng Zhang, Yacov A. Shamash, "Physics-Informed, Safety and Stability Certified Neural Control for Uncertain Networked Microgrids", *IEEE Transactions on Smart Grid*, accepted, Aug. 2023.
25. Fei Feng, Peng Zhang*, Mikhail Bragin, **Yifan Zhou**, "Novel Resolution of Unit Commitment Problems through Quantum Surrogate Lagrangian Relaxation," in *IEEE Transactions on Power Systems*, vol. 38, no. 3, pp. 2460-2471, May 2023.
24. **Yifan Zhou**, Peng Zhang*, "Noisy Intermediate-Scale Quantum Electromagnetic Transients Program," in *IEEE Transactions on Power Systems*, vol. 38, no. 2, pp. 1558-1571, Mar. 2023.
23. Fei Feng, **Yifan Zhou**, Peng Zhang*, "Noise-Resilient Quantum Power Flow," in *iEnergy*, vol. 2, no. 1, pp. 63-70, Mar. 2023.
22. Fei Feng, Peng Zhang*, **Yifan Zhou**, Lizhi Wang, "Distributed Networked Microgrids Power Flow," in *IEEE Transactions on Power Systems*, vol. 38, no. 2, pp. 1405-1419, Mar. 2023.
21. **Yifan Zhou**, Peng Zhang*, "Noise-Resilient Quantum Machine Learning for Stability Assessment of Power Systems," in *IEEE Transactions on Power Systems*, vol. 38, no. 1, pp. 475-487, Jan. 2023.
20. Fei Feng, Peng Zhang*, **Yifan Zhou**, Zefan Tang, "Quantum Microgrid State Estimation," in *Electric Power Systems Research*, vol. 212, pp. 108386, Nov. 2022.
19. Dmitrii A. Etingov, Peng Zhang*, Zefan Tang, **Yifan Zhou**, "AI-Enabled Traveling Wave Protection for Microgrids," in *Electric Power Systems Research*, vol. 210, pp. 108078, Sep. 2022.
18. **Yifan Zhou**, Zefan Tang, Nima Nikmehr, Pouya Babahajiani, Fei Feng, Tzu-Chieh Wei, Honghao Zheng, Peng Zhang*, "Quantum Computing In Power Systems," in *iEnergy*, vol. 1, no. 2, pp. 1-18, Jul. 2022.
17. Fei Feng, Peng Zhang*, **Yifan Zhou**, "Authentic Microgrid State Estimation," in *IEEE Transactions on Power Systems*, vol. 37, no. 2, pp. 1657-1660, Mar. 2022.
16. **Yifan Zhou**, Peng Zhang*, "Neuro-Reachability of Networked Microgrids," in *IEEE Transactions on Power Systems*, vol. 37, no. 1, pp. 142-152, Jan. 2022.

15. Lizhi Wang, **Yifan Zhou**, Wenfeng Wan, Peng Zhang*, "Eigenanalysis of Delayed Networked Microgrids," in *IEEE Transactions on Power Systems*, vol. 36, no. 5, pp. 4860-4863, Sept. 2021.
14. **Yifan Zhou**, Fei Feng, Peng Zhang*, "Quantum Electromagnetic Transient Program," in *IEEE Transactions on Power Systems*, vol. 36, no. 4, pp. 3813-3816, Jul. 2021.
13. Fei Feng, **Yifan Zhou**, Peng Zhang*, "Quantum Power Flow," in *IEEE Transactions on Power Systems*, vol. 36, no. 4, pp. 3810-3812, Jul. 2021.
12. **Yifan Zhou**, Peng Zhang*, "Reachable Dynamics of Networked Microgrids with Large Disturbances," in *IEEE Transactions on Power Systems*, vol. 36, no. 3, pp. 2416-2427, May. 2021.
11. **Yifan Zhou**, Peng Zhang*, "Reachable Power Flow: Theory to Practice," in *IEEE Transactions on Power Systems*, vol. 36, no. 3, pp. 2532-2541, May. 2021.
10. **Yifan Zhou**, Peng Zhang*, "Reachable Eigenanalysis," in *IEEE Transactions on Power Systems*, vol. 35, no. 6, pp. 4936-4939, Nov. 2020.
9. **Yifan Zhou**, Peng Zhang*, "Reachable Power Flow," *IEEE Transactions on Power Systems*, vol. 35, no. 4, pp. 3290-3293, Jul. 2020.
8. **Yifan Zhou***, Wei Hu, Le Zheng, Yong Min, Lei Chen, Zongxiang Lu, Ling Dong, "Power and Energy Flexibility of District Heating System and Its Application in Integrated Power and Heat Dispatch," in *Energy*, vol. 190, Jan. 2020.
7. **Yifan Zhou**, Wei Hu, Yong Min*, Yuanhang Dai, "Integrated Power and Heat Dispatch Considering Available Reserve of Combined Heat and Power Units," in *IEEE Transactions on Sustainable Energy*, vol. 10, no. 3, pp. 1300-1310, Jul. 2019.
6. **Yifan Zhou**, Wei Hu*, Yong Min, Le Zheng, "Active Splitting Strategy Searching Approach Based on MISOCP with Consideration of Island Stability," in *Journal of Modern Power Systems and Clean Energy*, vol. 7, no. 3, pp. 475-490, May 2019.
5. **Yifan Zhou**, Wei Hu*, Yong Min, Xialing Xu, Yong Li, "Modeling and Optimization of Multitype Power Sources Stochastic Unit Commitment Using Interval Number Programming," in *Journal of Energy Engineering*, vol. 143, no. 5, 2017.
4. Wei Hu*, Yong Min, **Yifan Zhou**, Qiuyu Lu, "Wind Power Forecasting Errors Modelling Approach Considering Temporal And Spatial Dependence," in *Journal of Modern Power Systems and Clean Energy*, vol. 5, no. 3, pp. 489-498, Jan. 2017.
3. **Yifan Zhou**, Wei Hu*, Yong Min, "Peak Regulation Compensation Price Decision for Combined Heat and Power Unit and Profit Allocation Method," in *Proceedings of the Chinese Society for Electrical Engineering*, vol.39, no.18, pp. 5325-5335+5579, 2019.
2. **Yifan Zhou**, Wei Hu*, Yong Min, Ling Dong, Yanhe Li, "Coordinated Power and Heat Dispatch Considering Peak Regulation Initiative of Combined Heat and Power Unit," in *Automation of Electric Power Systems*, vol.43, no.19, pp. 42-51, 2019.
1. **Yifan Zhou**, Wei Hu*, Yong Min, *et al*, "Dynamic Comprehensive Evaluation of Chinese Power System Development Level Based on Provincial Data," in *Automation of Electric Power Systems*, vol.40, no.18, pp. 76-83, 2016.

Peer-Reviewed Conference Proceedings

16. Sijia Yu, **Yifan Zhou***, "Distributed Quantum Machine Learning in Power System Transient Stability Assessment", *IEEE International Conference on Quantum Computing and Engineering (QCE)*, 2024.

15. Xuguo Fu, **Yifan Zhou***, "Learning-Based Uncertain Dynamic Verification of MMC-HVDC Offshore Wind Systems", *IEEE Power and Energy Society General Meeting (PESGM)*, 2024.
14. **Yifan Zhou***, Xuguo Fu, "Stochastic Dynamic Verification of Microgrids", *IEEE Power and Energy Society General Meeting (PESGM)*, 2024.
13. Sijia Yu, **Yifan Zhou***, "Quantum Adversarial Machine Learning for Robust Power System Stability Assessment", *IEEE Power and Energy Society General Meeting (PESGM)*, 2024.
12. Qing Shen*, **Yifan Zhou**, Huanfeng Zhao, Peng Zhang, Qiang Zhang, Slava Maslennikov, Xiaochuan Luo, "Powering the Future: Harnessing Neural Dynamic Equivalence for Enhanced Power System Applications", 2023 CIGRE Next Generation Network (NGN), May. 2023. **Top 5 in the NGN Paper Competition**.
11. Sijia Yu, Zefan Tang, Zimin Jiang, **Yifan Zhou***, "Scalable and Lightweight Distributed Local Routing for Quantum Network-Based Microgrids", *IEEE Power and Energy Society General Meeting (PESGM)*, 2023.
10. Lizhi Wang, Songyuan Zhang, **Yifan Zhou***, Chuchu Fan, Peng Zhang, Yacov A. Shamash, "Learning-Based, Safety and Stability-Certified Microgrid Control", *IEEE Power and Energy Society General Meeting (PESGM)*, 2023.
9. **Yifan Zhou**, Peng Zhang*, "Neural Electromagnetic Transients Program", *IEEE Power and Energy Society General Meeting (PESGM)*, 2022.
8. Zefan Tang, Peng Zhang*, **Yifan Zhou**, "Quantum Renewable Scenario Generation", *IEEE Power and Energy Society General Meeting (PESGM)*, 2022.
7. **Yifan Zhou**, Peng Zhang*, Yue Meng "An ODE-Enabled Distributed Transient Stability Analysis for Networked Microgrids", *IEEE Power and Energy Society General Meeting (PESGM)*, 2020.
6. **Yifan Zhou***, Wei Hu, Yong Min, *et al*, "A Semi-Supervised Anomaly Detection Method for Wind Farm Power Data Preprocessing", *IEEE Power and Energy Society General Meeting (PESGM)*, 2017.
5. Le Zheng, Wei Hu, **Yifan Zhou***, *et al*, "Deep belief network based nonlinear representation learning for transient stability assessment", *IEEE Power and Energy Society General Meeting (PESGM)*, 2017.
4. **Yifan Zhou***, Wei Hu, Yong Min, *et al*, "MILP-based Splitting Strategy Searching Considering Island Connectivity and Voltage Stability Margin", *IEEE Power and Energy Society General Meeting (PESGM)*, 2016.
3. **Yifan Zhou***, Wei Hu, Yong Min, *et al*, "A Novel Active Splitting Strategy Search Method with Modularity-based Network Partition", *IEEE Innovative Smart Grid Technologies - Asia (ISGT ASIA)*, 2015.
2. **Yifan Zhou***, Wei Hu, Yong Min, *et al*, "Coherency Feature Extraction based on DFT-based Continuous Wavelet Transform", *IEEE PES Asia-Pacific Power and Energy Engineering Conference (APPEEC)*, 2015.
1. **Yifan Zhou***, Wei Hu, Yong Min, *et al*, "Modelization and Optimization of Multi-Type Power Generators Joint Scheduling based on Improved PSO", *IEEE PES Asia-Pacific Power and Energy Engineering Conference (APPEEC)*, 2014.

Teaching and Mentoring

- **Teaching**
  - **ESE562 - AI-Driven Smart Grids, SBU**
    Fall 2024, Evaluation: –/–.

  - **ESE352 - Electromechanical Energy Converters, SBU**
    Fall 2024, Evaluation: –/–.
    Fall 2023, Evaluation: 5.0/5.0.
    Fall 2022, Evaluation: 5.0/5.0.
  - **EEO425 - Electric Machinery and Energy Conversion, SBU**
    Fall 2024, Evaluation: –/–.
    Fall 2023, Evaluation: 5.0/5.0.
    Fall 2022, Evaluation: 4.8/5.0.
  - **ESE586 - Microgrids, SBU**
    Fall 2023, Evaluation: 4.5/5.0.
    Fall 2022, Evaluation: 5.0/5.0.

- **Mentoring**
  - **PhD students**:
    Sijia Yu (Spring 2023 -), Xuguo Fu (Fall 2023 -), Yao Xiao (Fall 2024 -).
  - **Co-advised PhD students**:
    Qing Shen (primary advisor: Peng Zhang at SBU).
  - **Undergraduate students**:
    Alan Mani, Tasnim Harun, Eshan Shakrani, Tylon Guan, Saad Satter (through SBU's Senior Design Project (SDP)).
  - **High school students**:
    Trisha Sabadra, Asha Boyapati (through SBU's Computer Science and Informatics Summer Research Experience Program (CSIRE))

Awards

- 2023 Young Academic Inventor's Award from the National Academy of Inventors (NAI) Stony Brook University Chapter 2023
  Recognized for "**Dr. Zhou's fundamental work in quantum computing techniques for large-scale power system problems**"
- Outstanding Reviewer for IEEE Transactions on Power Systems 2021
- Outstanding Graduate of Tsinghua University (**1.5%**) 2014
- Tsinghua First-Class Scholarship for Integrated Excellence 2015,2013,2012
- Outstanding Graduate of Beijing 2014
- Outstanding Thesis Award, Tsinghua University 2014

Service

Editorial and Review Services

- Reviewer of NSF ECCS, CISE.
- Associate Editor of IEEE Journal of Oceanic Engineering, Energy Reports, IEEE Access (PES Section).
- Session Chair of two sessions "Quantum Computing and Learning" and "Benchmarking and Assessment" at 2024 IEEE International Conference on Quantum Computing and Engineering (QCE24)
- Technical program committee (TPC) member of QCE24.

- Reviewer of IEEE Transactions on Power Systems, IEEE Transactions on Smart Grid, IEEE Transactions on Sustainable Energy, IEEE PES Letters, Scientific Reports, Energy, Applied Energy, IEEE PES General Meeting, Power System Computing Conference, etc.

University and Department Service

- Faculty search committee member for non-tenure-track Lecturer for Engineering AI at SBU ECE. Jun. 2024-Present.
- Faculty search committee member for tenure-track Assistant Professor for ML/AI at SBU ECE. Sep. 2023 - May. 2024.
- Member of the AI Research & Application Working Group at SBU.

Ph.D. Dissertation Committee Member

- Xiaoqi Dong (Supervisor: Haipeng Xing from the Department of Applied Math & Statistics at SBU) Jul. 2024
- Marzieh Ajirak (Supervisor: Petar M. Djuric from the Department of Electrical and Computer Engineering at SBU) Oct. 2023
- Shouvik Roy (Supervisor: Scott A. Smolka and Stott D. Stollar from the Department of Computer Science at SBU) Jul. 2023

Talks

- NSF Climate, Sustainability & Quantum Computing Workshop: "Deployable Quantum Technologies for Resilient, Sustainable and Secure Energy Systems" Oct. 2023
- Naval Postgraduate School: "Formal Verification of Microgrids: Model-Driven and Data-Driven Approaches" May. 2023
- Distributed Quantum Processing (DQP) Workshop: "Quantum Machine Learning in Power System Stability Assessment" Nov. 2022
- IEEE PES Publications Webinar Series: "Quantum Computing in Power System Analytics" Oct. 2022
- University of Wisconsin-Madison Rising Star Seminar: "Learning-Based, Verifiable Smart Grids" Apr. 2022
- New York's Offshore Wind Training Program: "Dynamic Modeling and Analysis of Wind Turbine Generators and HVDC Transmission" Jun. 2022
- New York's Offshore Wind Training Program: "Wind Energy Converters and Power Electronics for Wind Turbines" Jun. 2022
- New York State Master Teacher Program, "Grid Integration of Offshore Wind Energy Systems: An Introduction" March. 2022
- Stony Brook University CPS & Verification Seminar: "Reachability Analysis of Networked Microdots" Oct. 2021