

# Xinyi Zhao

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## EDUCATION BACKGROUND

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### Tsinghua University

M.S. in Electrical Engineering, Tsinghua-Berkeley Shenzhen Institute (TBSI)

GPA: 3.98/4.00 (Rank 1/128); Co-advised by: [Prof. Hongbin Sun](#) and [Dr. Xinwei Shen](#); To be conferred Jun. 2021

Shenzhen, China

Sept. 2018-Now

### Wuhan University

B.Eng. in Electrical Engineering, Department of Electrical Engineering and Automation

GPA: 3.87/4.00 (Rank 4/340);

Wuhan, China

Sept. 2014-Jun. 2018

## PUBLICATIONS

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### ◇ Journals:

- **Xinyi Zhao**, Xinwei Shen, Qinglai Guo, Hongbin Sun and Shmuel S. Oren. *A Stochastic Distribution System Planning Method Considering Regulation Services and Energy Storage Degradation*. **Applied Energy**, 2020, 277:115520. [\[PDF\]](#)
- Zhiyong Yuan, Yiqi Zhao, Zuogang Guo, Xiyuan Ma, Jinyong Lei, **Xinyi Zhao**, et al. *Research Summary of Integrated Energy Systems Planning for Energy Internet*. **Southern Power System Technology**, 2019, 7:1-9.

### ◇ Conferences:

- **Xinyi Zhao**, Xinwei Shen, Hongkun Chen, et al. *A Two-Stage Multi-Objective Planning Strategy for Electric Vehicle Charging Stations Considering Power-loss Sensitivity in Distribution System*. **2nd IEEE Conference on Energy Internet and Energy System Integration**, 2018. [\[PDF\]](#)
- **Xinyi Zhao**, Xinwei Shen, Tian Xia, et al. *Optimal Distribution System Planning Considering Regulation Services and Degradation of ESSs*. **11th International Conference on Applied Energy**, 2019. [\[PDF\]](#)
- Yuquan Liu, **Xinyi Zhao**, Xinwei Shen, et al. *A Distribution System Expansion Planning Method Considering Integrated Energy Service Providers' Revenue on Energy Storage Investment*. **25th International Conference on Electricity Distribution**, 2019. [\[PDF\]](#)

### ◇ Patent:

- **Xinyi Zhao**, Linxin Yin, Shinan Song, Huiyi Hu, Zhi Zhang and Yu Zheng. *Human Body Knee Jerk Intelligent Diagnosis and Treatment Percussion Hammer based on Six-axis Acceleration Transducer*. (No: **201710279460.6**, **Invention Granted**), 2017. [\[Abstract\]](#)

## RESEARCH EXPERIENCE

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### Smart Grid and Renewable Energy Laboratory

*Distribution System Planning Considering Regulation Services and ESS Degradation*

Shenzhen, China

Sept. 2018-Now

### ◇ Considered degradation model of storage units in distribution system planning

- Added a linear degradation penalty term in the objective to avoid excessive charge/discharge of ESSs;
- Compared degradation curves of ESSs in different cases, and identified that the storage lifetime was prolonged for one year when considering degradation penalty.

### ◇ Developed Gaussian mixture model to generate stochastic scenarios

- Adopted GMM to model distributions of load demand, LMP, regulation signals and prices accurately to generate diverse stochastic scenarios.

### ◇ Modified progressive hedging algorithm

- Proved that a rational average solution is superior to the traditional mathematical expectation ( $\sum_{s \in S} \theta_s \cdot X_s$ ) on stable convergence when implementing *non-anticipativity* constraints;
- Found that with parallel computing and gap-dependent penalty factors, the modified progressive hedging outperformed Gurobi and the L-shaped method.

**Smart Grid and Renewable Energy Laboratory****Distribution System Expansion Planning Considering IESPs' Revenue on ESSs****Shenzhen, China**

Jan. 2019-Jul. 2019

- ◇ **Analyzed cost contribution arrangement between the utility and integrated energy service providers**
  - Helped Guangzhou Power Grid Corp. determine an investment proportion of ESSs to attract IESPs, which was published in CIRED 2019. [\[Poster\]](#)
- ◇ **Adopted benders decomposition in the planning problem**
  - Solved the planning problem within acceptable time, and improved the computation efficiency by 2–6 times compared with the Branch & Bound method.

**Power System Research Center in WHU****Multi-objective Planning for Large-scale EVs Considering Power-loss Sensitivity****Wuhan, China**

Feb. 2018-Jun. 2019

- ◇ **Calculated power-loss sensitivity index to identify candidate sites of electric vehicle charging stations**
  - Based on power flow equations in polar coordinates, a sensitivity index which is the derivative of the total power loss with respect to node voltage is established;
  - Located charging stations at nodes with largest sensitivity indices, to reduce the energy losses of the whole system as much as possible.
- ◇ **Designed multi-objective sizing problem**
  - Maximized the utility income as well as minimized the overall cost for charging stations;
  - Employed NSGA-II to obtain the Pareto solution set, and adopted fuzzy clustering to select the optimal solution from the Pareto set.

**AWARDS**

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**Graduate Career:**

- Tsinghua Comprehensive Scholarship (3/84)

Sept. 2019

**Undergraduate Career:**

- First Prize in the 10th National University Students Electrical Math Modeling Competition
- First Power Exploration Scholarship of Wuhan University (3/340)
- China National Scholarship (Top 0.2% of all undergraduate students in China)
- First-class Student Scholarship & Merit Student Scholarship of Wuhan University
- Merit Freshmen Scholarship of Wuhan University (Top 5% of students enrolled in WHU)

Aug. 2017

Sept. 2016

Nov. 2015

Nov. 2015

Dec. 2014

**TEACHING**

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- TA, [Reinforcement Learning for Energy Systems](#) (16 hrs), [Prof. Scott Moura](#) Summer, 2020
- TA, [Introduction of Smart Grid](#) (32 hrs), [Prof. Ye Guo](#) and [Prof. Yinliang Xu](#) Spring, 2020
- TA, [Energy-Environment and Data-Information 100 level](#) (16 hrs), [Prof. Xuan Zhang](#) Fall, 2019

**INVITED PRESENTATION**

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- Conference oral presentation: *Optimal Distribution System Planning Considering Regulation Services and Degradation of Energy Storage Systems*. **ICAE 2019**, Västerås, Sweden, selected for further considerations in **Applied Energy** (Top 5%). [\[PPT\]](#)

**SKILLS & CERTIFICATE**

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- Skills: Matlab (Proficient with YALMIP toolbox), Visio (Proficient), Multisim, LaTeX, Microsoft Office Suite;
- Certificate: China National Computer Rank Examination Level 2 (C Language Programming: 90+ /100), Chinese Calligraphy and Painting Tests Level 9.