Yuanrui Sang

Email: ysang@utep.edu Phone: (915) 747-6632

Research Interests

Power system operations and planning, power system reliability and resilience, renewable energy integration, applications of power electronics in power systems, high performance computing, applications of blockchain

Academic Appointments

09/2019–Present **Assistant Professor**
Department of Electrical and Computer Engineering
The University of Texas at El Paso, El Paso, TX

Education

2019 **Ph.D. in Electrical and Computer Engineering**
University of Utah, Salt Lake City, UT

2015 **M.S. in Technology**
Western Carolina University, Cullowhee, NC

2009 **B.S. in Electrical Engineering**
Southwest Jiaotong University, Chengdu, China

Credentials

11/2018 **Certified Mentor** Office of Undergraduate Research at the University of Utah

Funding

Current Funding

Project: Risk Quantification for Electric Power Generation
Funding Agency: University Research Institute
Amount: $5,000
Single PI: Yuanrui Sang
Period: 01/17/2020 – 08/31/2020

Pending Proposals

Project: A Resilience-Oriented Resource Management System for HPC systems
Funding Agency: The U.S. Department of Energy
Amount: $750,000
Single PI: Yuanrui Sang
Pre-application has been approved and full proposal is invited.

Publications

Google Scholar Citations: 79 h-index: 5 i10-index: 3

Journal Papers

[J7] **Yuanrui Sang**, Mostafa Sahraei-Ardakani, and Omid Ziaee, "Coordinating Transmission Switching and Energy Storage in Congested Networks with High Wind Penetration," to be submitted.

[J6] **Yuanrui Sang**, Jiayue Xue, Mostafa Sahraei-Ardakani, and Ge Ou, "An Integrated Preventive Operation Framework for Power Systems during Hurricanes," *IEEE Systems Journal*, accepted.

[J5] **Yuanrui Sang**, and Mostafa Sahraei-Ardakani, "Effective Power Flow Control via Distributed FACTS Considering Future Uncertainties," *Electric Power Systems Research*, vol. 168, pp. 127-136, March 2019.

[J4] Mostafa Sahraei-Ardakani and **Yuanrui Sang**, "Discussion on Linear Modeling of Variable Reactance in "Co-Optimization of Transmission Expansion Planning and TCSC Placement Considering the Correlation Between Wind and Demand Scenarios"," *IEEE Transactions on Power Systems*, vol. 33, no. 5, pp. 5808-5809, Sept. 2018.

[J3] **Yuanrui Sang**, Mostafa Sahraei-Ardakani, and Masood Parvania, "Stochastic Transmission Impedance Control for Enhanced Wind Energy Integration," *IEEE Transactions on Sustainable Energy*, vol. 9, no. 3, pp. 1108-1117, July 2018.

[J2] **Yuanrui Sang**, and Mostafa Sahraei-Ardakani, "The Interdependence between Transmission Switching and Variable-Impedance Series FACTS Devices," *IEEE Transactions on Power Systems*, vol. 33, no. 3, pp. 2792-2803, May 2018.

[J1] **Yuanrui Sang**, H. Bora Karayaka, Yanjun Yan, James Z. Zhang, Darek Bogucki, and Yi-Hsiang Yu, "A Rule-Based Phase Control Methodology for a Slider-Crank Wave Energy Converter Power Take-Off System," *International Journal of Marine Energy*, vol. 19, pp. 124-144, Sept. 2017.

Book Chapters

[B1] **Yuanrui Sang**, H. Bora Karayaka, Yanjun Yan, Nadir Yilmaz, David Souders, "Ocean (Marine) Energy," Book Title: "Comprehensive Energy Systems," Elsevier, Feb 21, 2018.

Conference Papers

[C11] **Yuanrui Sang**, Umit Cali, Murat Kuzlu, Manisa Pipattanasomporn, Claudio Lima, and Sijie Chen, "IEEE SA Blockchain in Energy Standardization Framework: Grid Prosumer Edge Use Cases," *IEEE PES General Meeting*, Montreal, CA, 2020, accepted.

[C10] Mostafa Sahraei-Ardakani, Farshad Mohammadi, Ge Ou, Zhaoxia Pu, Jiayue Xue, Xin Li, and **Yuanrui Sang**, "Reliability Enhancement via Integration of Extreme Weather Forecast in Power System Operation," in *Proc. 9th International Conference on Power and Energy Systems (ICPES)*, Perth, Australia, 2019.

[C9] **(Best Paper Nomination) Yuanrui Sang**, Jiayue Xue, Mostafa Sahraei-Ardakani, and Ge Ou, "Comparing a New Power System Preventive Operation Method with a Conventional Industry Practice during Hurricanes," in *Proc. 51st North American Power Symposium*, Wichita, KS, USA, 2019.

[C8] **Yuanrui Sang**, and Mostafa Sahraei-Ardakani, "Enhancing Wind Energy Integration by Co-optimizing Energy Storage Systems and Transmission Switching," in *Proc. IEEE PES General Meeting*, Atlanta, GA, USA, 2019.

[C7] **Yuanrui Sang**, Jiayue Xue, Mostafa Sahraei-Ardakani, and Ge Ou, "Effective Scenario Selection for Preventive Stochastic Unit Commitment during Hurricanes," in *Proc. International Conference on Probabilistic Methods Applied to Power Systems (PMAPS)*, Boise, ID, USA, 2018.

[C6] **Yuanrui Sang**, and Mostafa Sahraei-Ardakani, "Analyzing Mutual Influences of Conventional and Distributed FACTS via Stochastic Co-optimization," in *Proc. International Conference on Probabilistic Methods Applied to Power Systems (PMAPS)*, Boise, ID, USA, 2018.

[C5] **Yuanrui Sang**, and Mostafa Sahraei-Ardakani, "Economic Benefit Comparison of D-FACTS and FACTS in Transmission Networks with Uncertainties," in *Proc. IEEE PES General Meeting*, Portland, OR, USA, 2018.

[C4] **(First Prize in the NAPS Student Paper Contest) Yuanrui Sang**, and Mostafa Sahraei-Ardakani, "The Link Between Power Flow Control Technologies: Topology Control and FACTS," in *Proc. 49th North American Power Symposium*, Morgantown, WV, USA, 2017.

[C3] **Yuanrui Sang**, H. Bora Karayaka, Yanjun Yan, James Z. Zhang, Eduard Muljadi and Yi-Hsiang Yu, "Energy Extraction from A Slider-Crank Wave Energy Converter under Irregular Wave Conditions," in *Proc. IEEE/MTS Oceans*, Washington D.C., USA, 2015, pp. 1-7.

[C2] **Yuanrui Sang**, H. Bora Karayaka, Yanjun Yan, James Z. Zhang and Eduard Muljadi, "Irregular Wave Energy Extraction Analysis for A Slider Crank WEC Power Take-off System," in *Proc. ACEMP-OPTIM-ELECTROMOTION Joint Conference*, Side, Turkey, 2015, pp. 348-354.

[C1] **Yuanrui Sang**, H. Bora Karayaka, Yanjun Yan, and James Z. Zhang, "Resonance Control Strategy for a Slider Crank WEC Power Take-off System," in *Proc. IEEE/MTS Oceans*, St. John's, NL, Canada, 2014, pp. 1-8.

Invited Talks and Panel Sessions

Chair	Panel session at the IEEE PES General Meeting 2020: Addressing Power System Operation Challenges Using Blockchain, August 2020.
Invited speaker	Panel session at the INFORMS Annual Meeting 2019: Power flow optimization and control
Co-chair	Panel session at the IEEE PES General Meeting 2019: Emerging applications and benefits for blockchains and smart contracts for the smart grid

Honors and Awards

10/2019	First Place in the Elevator Pitch Competition at the 51st North American Power Symposium (NAPS), Wichita, KS.
04/2019	Customer's Choice Award, The Bench-to-Bedside Entrepreneurship Competition at The University of Utah
02/2019	Runner-up in the Three Minute Thesis (3MT) Competition at the University of Utah
10/2018	Received a $3,000 grant from the NSF I-Corps Program at the University of Utah as a technical lead
04/2018	University of Utah Graduate School Travel Award
09/2017	First Prize in the 49th North American Power Symposium (NAPS) Student Paper Contest
04/2017	GCSC Travel Award (from Global Change and Sustainability Center, University of Utah)
2016–2017	Ph.D. Student Fellowship Award (from Department of Electrical and Computer Engineering, University of Utah)
04/2015	Most Outstanding Student (from Kimmel School of Construction Management and Technology at Western Carolina University, one winner in the department each year)
04/2015	Western Carolina University IEEE Student Branch Academic Honor Cord recipient
03/2015	Best Presentation Nomination in the Twenty-Third Annual Graduate Research Symposium of Western Carolina University
11/2014	First Place in the Three Minute Thesis (3MT) Competition at Western Carolina University

10/2014 Kendall King Scholarship (from Western Carolina University)

2014–2015 Graduate Fellowship Award (from the Graduate School of Western Carolina University: one winner in the department each year)

2014–2015 Kimmel School Graduate Fellowship Award (from the Kimmel School of Western Carolina University: one winner in the department each year)

02/2014 Graduate Summer Assistantship Award (from the Graduate School of Western Carolina University)

12/2013 Graduate Student Research and Creative Projects Award (from the Graduate School of Western Carolina University)

Research Experience

05/2017–Present **Research Assistant** **University of Utah, Salt Lake City, UT**

Supervisor: Mostafa Sahraei-Ardakani

1) Developed stochastic optimization models of power flow control technologies in electric power transmission systems, and applied high performance computing to these models; studied the impact of power flow control technologies on renewable energy generation. 2) Developed a preventive operation model for power systems to reduce hurricane-induced outages.

08/2013–05/2015 **Research Assistant** **Western Carolina University, Cullowhee, NC**

Supervisor: Hayrettin Bora Karayaka

Developed a rule-based control strategy for a slider-crank ocean wave energy converter, and studied the efficiency of wave energy extraction using the proposed method.

Teaching Experience

The University of Texas at El Paso

Spring 2020 Instructor, ECE 4395/5390: Special Topics – Flexible Power Transmission Systems

Fall 2019 Instructor, ECE 4395/5390: Special Topics – Power System Reliability

University of Utah

Spring 2017 Teaching Assistant (Lab Instructor), ECE 1250: Electrical and Computer Engineering Design

Teaching Assistant (Grader), ECE 3530: Engineering Probability and Statistics

Fall 2016 Teaching Assistant (Grader), ECE 5510: Random Processes

Western Carolina University

Spring 2015 Teaching Assistant (Grader), ENGR 493: Power Electronics

Fall 2014 Teaching Assistant (Lab Instructor), ECET 346: Modern Power Systems Analysis

Spring 2014 Teaching Assistant (Grader), EE 424: Digital Signal processing

Teaching Assistant (Grader), EE 200: Computer Utilization

Fall 2013 Teaching Assistant (Grader), ECET 231: Circuit Analysis I

Teaching Assistant (Grader), EE 200: Computer Utilization

Industry Experience

05/2018–08/2018 **Grid Operations and Planning Intern**

Electric Power Research Institute **Palo Alto, CA, USA**

Developed a linking tool between long-term generation planning and production cost model for the Western Electricity Coordinating Council (WECC) system.

08/2009–07/2013 **Electrical Engineer**
Chengdu Rail Transit Group Co., Ltd. **Chengdu, China**

Responsibilities include locomotive manufacturing supervision, maintenance of the locomotive motor drive and auxiliary power supply systems, locomotive testing, maintenance scheduling and guideline drafting, responding to locomotive issue reports and offering technical training sessions to new employees.

Service

Reviewer IEEE Transactions on Smart Grid
IEEE Transactions on Power Systems
Applied Soft Computing
IEEE Power Engineering Letters
International Transactions on Electrical Energy Systems
International Journal of Electrical Engineering Education
2020 IEEE Power and Energy Society General Meeting (IEEE PES GM 2020)
The North American Conference on Innovative Smart Grid Technologies (IEEE ISGT 2020)
IEEE PES Transmission & Distribution Conference & Exposition (IEEE PES T&D 2020)
2019 IEEE Power and Energy Society General Meeting (IEEE PES GM 2019)
The Ninth Conference on Innovative Smart Grid Technologies (IEEE ISGT 2018)
2018 IEEE Power and Energy Society General Meeting (IEEE PES GM 2018)
Total number of papers reviewed: 67

Member UTEP ECE Outreach committee (2020-Present)

Member IEEE PES Smart Buildings, Loads and Customer Systems Committee Paper Review Working Group for IEEE PES General Meeting 2020 (2019-2020)

Member IEEE Standard Association P2418.5 (Blockchain in Energy) Working Group (2019-Present)

Member IEEE PES Power System Economics Subcommittee Natural Disaster Mitigation Methods and Operation Technology Working Group (2018-Present)

Member IEEE PES Power System Economics Subcommittee (2018-Present)

Secretary IEEE PES Smart Buildings, Loads and Customer Systems Committee Blockchain Working Group (2018-Present), **contributed to the blockchain section of IEEE PES Emerging Technologies White Paper 2018**

Member IEEE Blockchain Initiative Conferences and Events Committee (2018-Present)

Member Graduate Student Advisory Committee of the ECE Department at the University of Utah (the 2017-2018 academic year)

Volunteer FIRST Tech Challenge (FTC) El Paso League Championship (2020)
Utah Girl Scout Night Junior - G.I.R.L. Engineer: Innovation and Inspiration (2018)
Utah Regional FIRST Robotics and FIRST Lego League Competitions (2018)
Utah Women Tech Council (2018)
Western North Carolina Science and Engineering Fair (2014-2015)