

Curriculum Vitae
Mostafa Sahraei-Ardakani
December 2018

Department of Electrical and Computer Engineering
University of Utah
Email: mostafa.ardakani@utah.edu
<http://ardakani.ece.utah.edu>

2218 Merrill Engineering Building
50 Central Campus Dr.
Salt Lake City, UT 84112
Phone: (801) 587-8883

EDUCATION

Ph.D., Energy Engineering—Energy Management and Policy, 2013
The Pennsylvania State University
Dissertation: Policy Analysis in Transmission-Constrained Electricity Markets

M.Sc., Electrical Engineering—Power Systems, 2008
University of Tehran
Thesis: Dynamic Modeling of Electricity Markets

B.Sc., Electrical Engineering—Control, 2006
University of Tehran

PROFESSIONAL APPOINTMENTS

Assistant Professor, July 2016 – Present
Department of Electrical and Computer Engineering, University of Utah, Salt Lake City, UT

Post-Doctoral Scholar, 2013 – June 2016
School of Electrical, Computer, and Energy Engineering, Arizona State University, Tempe, AZ

GRANTS AND CONTRACT FUNDING

Current Grants and Contract Funding

“PAROTS: Practical and Reliable Operational Transmission Solutions”
Funding agency: Advanced Research Projects Agency—Energy (ARPA-E)
Amount: \$250,000
PI: Mostafa Sahraei-Ardakani
Period: 11/2018 – 11/2019
Annual Support: 1 person-month

“EAGER: Real-Time: Effective Power System Operation during Hurricanes using Historical and Real-Time Data”
Funding Agency: National Science Foundation
Amount: \$298,681

PI: Mostafa Sahraei-Ardakani (with Ge Ou and Zhaoxia Pu)
Period: 10/15/2018 – 10/14/2020
Annual Support: 0.75 person-month

“Automated Preventive Power System Operation During Hurricanes”
Funding Agency: Utah Science Technology and Research (USTAR) initiative
Amount: \$196,230
PI: Mostafa Sahraei-Ardakani (with Ge Ou and Zhaoxia Pu)
Period: 7/1/2018 – 12/31/2019
Annual Support: 0.75 person-month

“Efficient Utilization of Flexible Transmission for Renewable Energy Integration”
Funding Agency: National Science Foundation
Amount: \$167,240
PI: Mostafa Sahraei-Ardakani
Period: 3/1/2017 – 2/28/2019

Past Grants and Contract Funding

“Visualization and decision support tool for interdependent critical infrastructure”
Funding Agency: University of Utah Research Foundation
Amount: \$35,000
PI: Mostafa Sahraei-Ardakani
Period: 1/2017 – 9/2018

Pending Proposals

“Coordinated Operation of Water Desalination and Power Systems”
Funding agency: Kuwait Institute for Scientific Research
Amount: \$115,000
PI: Mostafa Sahraei-Ardakani
Period: 1/2019 – 6/2020
Annual Support: 1 person-month
Status: Funded (Project will begin in January 2019)

“CAREER: Deregulation of Power Flow Controllers Through Efficient Market Design”
Funding Agency: National Science Foundation
Amount: \$571,412
PI: Mostafa Sahraei-Ardakani
Period: 3/1/2019 – 2/28/2024
Annual Support: 1 person-month
Status: Pending (Submitted in July 2018)

“Demonstration of Enhanced Operation of Variable-Impedance Power Flow Control Devices in Mobile and Fixed-location Deployment”

Funding Agency: New York State Energy Research and Development Authority (NYSERDA)

Amount: \$4,270,000

PI: Tom Nudell, Smart Wires Inc. (Co-PI: Mostafa Sahraei-Ardakani)

Period: 6/2019-6/2021

Annual Support: 1 person-month

Status: Under review

“Leveraging Existing Water and Wastewater System Infrastructure to Develop Pumped Storage Hydro-power”

Funding Agency: Department of Energy

Amount: \$1,397,819

PI: Mostafa Sahraei-Ardakani

Period: 6/2019-5/2021

Annual Support: 1 person-month

Status: Full proposal under review (Concept paper was encouraged)

“Urban Hydropower System with Distributed Mini Pumped Storage in High-rise Buildings and Water Towers”

Funding Agency: Department of Energy

Amount: \$764,490

PI: Ge Ou (Co-PI: Mostafa Sahraei-Ardakani)

Period: 6/2019-5/2021

Annual Support: 1 person-month

Status: Full proposal under review (Concept paper was encouraged)

“Distributed Energy Resources Management System with Proactive Situational Awareness (PSA-DERMS)”

Funding Agency: Department of Energy

Amount: \$5,749,434

PI: Mingxi Liu (Co-PI: Mostafa Sahraei-Ardakani)

Period: 7/2019-6/2021

Annual Support: 1 person-month

Status: Pending

PUBLICATIONS

Refereed Journal Articles (Under Review)

1. **Mostafa Sahraei-Ardakani**, Salvi Asefi, and Amanda D. Smith, “Mission Impossible: Carbon Footprinting Electricity,” *Environmental Science & Technology*, under review, 2018.
2. F. Mohammadi, **M. Sahraei-Ardakani**, Y. Al-Abdullah, and Gerald T. Heydt, “Coordinated Scheduling of Power Generation and Water Desalination Units,” *IEEE Transactions on Power Systems*, under review, 2018.

3. S. A. Sadat and **Mostafa Sahraei-Ardakani**, “Reducing the Risk of Cascading Failures via Transmission Switching,” *IEEE Transactions on Power Systems*, under review, 2018.
4. Y. Sang, J. Xue, **M. Sahraei-Ardakani**, and G. Ou, “Reducing Hurricane-induced Power Outages through Preventive Operation,” *IEEE Transactions on Power Systems*, under review, 2018.

Refereed Journal Articles

5. Y. Sang and **M. Sahraei-Ardakani**, “Effective Power Flow Control via Distributed FACTS Considering Future Uncertainties,” *Electric Power System Research*, vol. 168, pp. 127-136, March 2019.
6. **M. Sahraei-Ardakani**, “Merchant Power Flow Controllers,” *Energy Economics*, vol. 74, pp. 878-885, Aug. 2018.
7. **M. Sahraei-Ardakani** and Y. 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, Sep. 2018.
8. A. Nikoobakht, J. Aghaei, M. Parvania, and **M. Sahraei-Ardakani**, “Contribution of FACTS Devices in Power Systems Security using MILP-Based OPF,” *IET Generation, Transmission & Distribution*, vol. 12, no. 15, pp. 3744 – 3755, 2018.
9. Y. Sang, **M. Sahraei-Ardakani**, and M. Parvania, “Stochastic Transmission Impedance Control for Enhanced Wind Energy Integration,” *IEEE Transactions on Sustainable Energy*, vol. 9, no. 3, pp. 1108-1117, Jul. 2018.
10. Y. Sang and **M. 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.
11. Q. Zhang and **M. Sahraei-Ardakani**, “Distributed DCOPF with Flexible Transmission,” *Electric Power System Research*, vol. 154, pp. 37-47, Jan 2018.
12. X. Li, P. Balasubramanian, **M. Sahraei-Ardakani**, K. W. Hedman, and R. Podmore, “Real-Time Contingency Analysis with Corrective Transmission Switching,” *IEEE Transactions on Power Systems*, vol. 32, no. 4, pp. 2604 - 2617, Jul. 2017.
13. M. Abdi-Khorsand, **M. Sahraei-Ardakani**, and Y. Al-Abdullah, “Corrective Transmission Switching with $N-1-1$ Contingency Analysis,” *IEEE Transactions on Power Systems – Special Issue on Harnessing Flexible Transmission Assets*, vol. 32, no. 2, pp. 1606-1615, Mar. 2017.
14. **M. Sahraei-Ardakani** and K. W. Hedman, “Computationally Efficient Control of FACTS Set Points in DC Optimal Power Flow with Shift Factor Structure,” *IEEE Transactions on Power Systems*, vol. 32, no. 3, pp. 1733 - 1740, May 2017.
15. Y. Al-Abdullah, **M. Sahraei-Ardakani**, “Analysis of Reserve Relaxations in Electric Energy Markets,” *Electric Power System Research*, vol. 141, pp. 460-466, Dec. 2016.
16. J. Lyon, S. Maslennikov, **M. Sahraei-Ardakani**, T. Zhang, E. Litvinov, X. Li, P. Balasubramanian, and K. Hedman, “Harnessing Smart Flexible Transmission: Corrective Transmission Switching for ISO-NE,” *IEEE Power and Energy Technology Systems Journal*, vol. 3., no. 3, pp. 109-118, Sep. 2016.

17. **M. Sahraei-Ardakani** and S. Blumsack, "Transfer Capability Improvement through Market-Based Operation of Series FACTS Devices," *IEEE Transactions on Power Systems*, vol. 31, no. 5, pp. 3702-3714, Sep. 2016.
18. P. Balasubramanian, **M. Sahraei-Ardakani**, X. Li, and K. W. Hedman, "Towards Smart Corrective Switching: Analysis and Advancement of PJM's Switching Solutions," *IET Generation, Transmission, and Distribution*, vol. 10, no. 8, pp. 1984-1992, 2016.
19. **M. Sahraei-Ardakani** and K. Hedman, "A Fast LP Approach for Enhanced Utilization of FACTS Devices," *IEEE Transactions on Power Systems*, vol. 31, no. 3, pp. 2204-2213, May 2016.
20. **M. Sahraei-Ardakani** and K. Hedman, "Day-Ahead Corrective Adjustment of FACTS Reactance: A Linear Programming Approach," *IEEE Transactions on Power Systems*, vol. 31, no. 4, pp. 2867-2875, Jul. 2016.
21. **M. Sahraei-Ardakani**, X. Li, P. Balasubramanian, K. Hedman, and M. Abdi-Khorsand, "Real-Time Contingency Analysis with Transmission Switching on Real Power System Data," *IEEE Transactions on Power Systems*, vol. 31, no. 3, pp. 2501-2502, May 2016.
22. **M. Sahraei-Ardakani**, S. Blumsack, and A. Kleit, "Estimating Zonal Electricity Supply Curves in Transmission-Constrained Electricity Markets," *Energy*, vol. 90, pp. 10-19, Feb. 2015.
23. **M. Sahraei-Ardakani**, S. Blumsack, and A. Kleit, "Distributional Impacts of State-Level Energy Efficiency Policies in Regional Electricity Markets," *Energy Policy*, Vol. 49, pp. 365-372, Oct. 2012.
24. **M. Sahraei-Ardakani** and A. Rahimi-Kian, "A Dynamic Replicator Model of the Players' Bids in an Oligopolistic Electricity Market", *Electric Power System Research*, Vol. 79, pp. 781-788, May 2009.

Refereed Conference Papers

25. F. Mohammadi, **M. Sahraei-Ardakani**, and Y. Al-Abdullah, "Coordinated Operation of Power Generation and Water Desalination," *10th IFAC Symposium on Control of Power and Energy Systems (CPES)*, Sept. 2018, Tokyo, Japan.
26. Y. Al-Abdullah and **M. Sahraei-Ardakani**, "Differences in locational marginal prices: Deterministic vs. stochastic market formulations," *2018 5th International Conference on Renewable Energy: Generation and Applications (ICREGA)*, Al-Ain, UAE.
27. S. Sadat, D. Haralson, and **M. Sahraei-Ardakani**, "Security versus Computation Time in IV-ACOPF with SOCP Initialization," *2018 IEEE International Conference on Probabilistic Methods Applied to Power Systems (PMAPS)*, Boise, ID, USA.
28. Y. Sang, J. Xue, **M. Sahraei-Ardakani**, and G. Ou, "Effective Scenario Selection for Preventive Stochastic Unit Commitment during Hurricanes," *2018 IEEE International Conference on Probabilistic Methods Applied to Power Systems (PMAPS)*, Boise, ID, USA.
29. Y. Sang and **Mostafa Sahraei-Ardakani**, "Analyzing the Mutual Influence of Conventional and Distributed FACTS via Stochastic Co-optimization," *2018 IEEE International Conference on Probabilistic Methods Applied to Power Systems (PMAPS)*, Boise, ID, USA.
30. Y. Sang and **Mostafa Sahraei-Ardakani**, "Economic Benefit Comparison of D-FACTS and FACTS in Transmission Networks with Uncertainties," *IEEE PES General Meeting 2018*, Portland, OR, USA.

31. S. Sadat, D. Haralson, and **M. Sahraei-Ardakani**, "Evaluation of Various Techniques to Warm-Start a Successive Linear Programming Algorithm for Solving the IV ACOPF," *IEEE PES General Meeting 2018*, Portland, OR, USA.
32. Q. Zhang and **M. Sahraei-Ardakani**, "Impact of Communication Limits on Convergence of Distributed DCOPF with Flexible Transmission," *2017 North American Power Symposium*, Morgantown, WV, USA.
33. Y. Sang and **M. Sahraei-Ardakani**, "The Link Between Power Flow Control Technologies: Topology Control and FACTS," *2017 North American Power Symposium*, Morgantown, WV, USA. (Best Paper Award)
34. **M. Sahraei-Ardakani** and Ge Ou, "Day-Ahead Preventive Scheduling of Power Systems During Natural Hazards via Stochastic Optimization," *IEEE PES General Meeting 2017*, Chicago, IL, USA.
35. **M. Sahraei-Ardakani**, A. Korad, K. Hedman, P. Lipka, and S. Oren, "Performance of AC and DC Based Transmission Switching Heuristics on a Large-Scale Polish System," *IEEE PES General Meeting 2014*, Washington, DC, USA.
36. **M. Sahraei-Ardakani** and S. Blumsack, "Marginal Value of FACTS Devices in Transmission-Constrained Electricity Markets," *IEEE PES General Meeting 2013*, Vancouver, BC, Canada.
37. **M. Sahraei-Ardakani** and S. Blumsack, "Active Participation of FACTS Devices in Wholesale Electricity Markets," *31st USAEE North American Conference*, 2012, Austin, TX, USA.
38. **M. Sahraei-Ardakani** and S. Blumsack, "Market Equilibrium for Dispatchable Transmission Using FACTS Devices," *IEEE PES General Meeting 2012*, San Diego, CA, USA.
39. S. Blumsack and **M. Sahraei-Ardakani**, "When is Transmission Not Transmission: Regulating Flexible Electric Transmission Architecture," *In Proc. of 31st Annual Eastern Conference*, 2012, Shawnee, PA, USA.
40. **M. Sahraei-Ardakani**, S. Blumsack, and A. Kleit, "Zonal Supply Curve Estimation With Fuzzy Marginal Fuel in Electricity Markets," *30th USAEE North American Conference*, 2011, Washington, DC, USA.
41. **M. Sahraei-Ardakani**, M. Peydayesh, and A. Rahimi-Kian, "DG planning under uncertainty using AHP Method," *IEEE PES General Meeting 2008*, Jul. 2008, Pittsburgh, PA, USA
42. **M. Sahraei-Ardakani**, M. Roshanaei, A. Rahimi-Kian, and C. Lucas, "A Study of Electricity Market Dynamics Using Invasive Weed Optimization," *IEEE Symposium on Computational Intelligence and Games (CIG08)*, pp. 276- 282, Dec. 2008, Perth, Australia
43. **M. Sahraei-Ardakani**, A. Rahimi-Kian, and M. Nili-Ahmadabadi, "Hierarchical Nash-Q learning in continuous games," *IEEE Symposium on Computational Intelligence and Games (CIG08)*, pp. 276- 282, Dec. 2008, Perth, Australia.
44. **M. Sahraei-Ardakani**, A. Rahimi-Kian, and M. Nili-Ahmadabadi, "Hierarchical Nash-Cournot Q-Learning in Electricity Markets," *17th IFAC World Congress*, Jul. 2008, Seoul, Korea.

Invited Talks and Conference Presentations

45. **M. Sahraei-Ardakani** and Y. Sang, “Optimal Portfolio of Power Flow Control Technologies: Topology and Impedance Control,” *INFORMS Annual Meeting 2018*, Phoenix, AZ, USA.
46. **M. Sahraei-Ardakani** and Y. Sang, “Energy Storage Planning in Presence of Topology Control,” *INFORMS Annual Meeting 2018*, Phoenix, AZ, USA.
47. **M. Sahraei-Ardakani** and Y. Sang, “Coordinated Planning and Operation of M-FACTS and Transmission Switching,” *23rd International Symposium on Mathematical Programming (ISMP)*, Jul. 2018, Bordeaux, France.
48. **M. Sahraei-Ardakani**, “Enhanced Operation of Power Flow Controllers through Efficient Algorithms,” *2018 IEEE T&D Conference and Exposition*, April 2018, Denver, CO.
49. **M. Sahraei-Ardakani**, “Operation of Power Flow Controllers: Computational Efficiency and Market Participation,” *EPRI ISO/RTO Market Design Tech Conference*, Feb. 2017, [Online].
50. **M. Sahraei-Ardakani**, “Harnessing Flexible Transmission for Economic and Reliable Operation of Electric Power Systems,” *Sharif University of Technology*, Dec. 2016, Tehran, Iran.
51. **M. Sahraei-Ardakani**, “Market-Based Operation of Flexible Transmission,” *University of Tehran*, Dec. 2016, Tehran, Iran.
52. **M. Sahraei-Ardakani**, “Reserve Deliverability Enhancement through Flexible Transmission,” *INFORMS Annual Meeting 2016*, Nashville, TN, USA.
53. **M. Sahraei-Ardakani**, “Co-optimization of Series Facts Device Set Points and Generation Dispatch,” *INFORMS Annual Meeting 2016*, Nashville, TN, USA.
54. **M. Sahraei-Ardakani**, “Operator Involvement in Electricity Market Solution,” *Penn State University*, Feb. 2016, University Park, PA, USA.
55. **M. Sahraei-Ardakani** and Seth Blumsack, “A Market Design for Participation of Flexible AC Transmission System (FACTS) Devices,” *42nd Annual Conference*, Eastern Economic Association, Feb. 2016, Washington, DC, USA.
56. K. Hedman, **M. Sahraei-Ardakani**, P. Balasubramanian, and X. Li, “Flexible Transmission Decision Support: Scalable Heuristics for Power Flow Control Devices,” *INFORMS Annual Meeting 2015*, Philadelphia, PA, USA.
57. **M. Sahraei-Ardakani** and K. Hedman, “Modeling and Reformulations of Flexible AC Transmission System (FACTS) Devices in Power Systems,” *22nd International Symposium on Mathematical Programming (ISMP)*, Jul. 2015, Pittsburgh, PA, USA.
58. K. Hedman and **M. Sahraei-Ardakani**, “Flexible Transmission Decision Support Systems,” *Increasing Market and Planning Efficiency Through Software*, Federal Energy Regulatory Commission, Jun. 2015, Washington, DC, USA.
59. **M. Sahraei-Ardakani** and K. Hedman, “System Operator Modifications to Electricity Market Solutions,” *INFORMS Annual Meeting 2014*, San Francisco, CA, USA.
60. S. Blumsack and **M. Sahraei Ardakani**, “Market-Based Control of Flexible Transmission Architectures,” *Center for Nonlinear Studies*, Los Alamos National Laboratory, May 2012, Santa Fe, NM, USA.

White Papers and Technical Reports

61. A. Kleit, S. Blumsack, Z. Lei, L. Hutelmyer, **M. Sahraei-Ardakani**, and S. Smith, “Impacts of Electricity Restructuring in Rural Pennsylvania,” Center for Rural Pennsylvania, March 2011.
62. **M. Sahraei-Ardakani**, S. Blumsack, and A. Kleit, “Zonal Supply Curve Estimation in Transmission-Constrained Electricity Markets,” 2011, Available at SSRN: <http://ssrn.com/abstract=1937411>.

GRADUATE STUDENTS ADVISED

Current M.S. and Ph.D. Students

1. Yuanrui Sang, Ph.D. Candidate, Expected Graduation: Summer 2019
2. Farshad Mohammadi, Ph.D. Student, Expected Graduation: 2021
3. Sayed Abdullah Sadat, Ph.D. Student, Expected Graduation: 2021
4. Xinyang Rui, Ph.D. Student, Expected Graduation: 2022

Past M.S. and Ph.D. Students

1. David Haralson, M.S. (Currently with: Rocky Mountain Power)
2. Shirsha Nandy, M.S. (Currently with: Rio Tinto)

TEACHING EXPERIENCE

Instructor

Introduction to Optimization, University of Utah, Spring 2019
(A new course that I developed for the college of engineering at the University of Utah)

Energy Infrastructure Planning and Management, CII-Tech, Ethiopia, Summer 2017
(Developed and taught; I taught this course a part of a Master’s program on Renewable Energy Engineering)

Modern Power Transmission, University of Utah, Spring 2017 and Spring 2018
(A new course that I developed and taught for the electrical engineering program at the University of Utah)

Power Electronics Fundamentals, University of Utah, Fall 2016, Fall 2017, and Fall 2018

Circuits I, (Faculty Associate), Arizona State University, Fall 2013 and Spring 2014

Co-Instructor

Modeling Electric Power Systems, Penn State University, Fall 2012

Teaching Assistant

Solar Project Development, Penn State University, Fall 2012

Computational Economics, Penn State University, Spring 2012

HONORS AND AWARDS

1. 2017 North American Power Symposium (NAPS) best paper award for the paper: “The Link Between Power Flow Control Technologies: Topology Control and FACTS,” with Yuanrui Sang, 2017
2. Edson entrepreneurship award, Arizona State University, 2015
3. EEEPI summer research award, Penn State University, 2012
4. Outstanding Organization Award – PSU IEEE Student Chapter, Penn State University, 2012
5. Dennis J. O'Brien USAEE best student paper award, 30th USAEE North American Conf., 2011
6. Engineering Research Award, Penn State graduate exhibition, 2011
7. IFAC Asian student travel award, IFAC, South Korea, 2008

INDUSTRY EXPERIENCE

Data Scientist, May 2014 – August 2014
Seven Lakes Technologies, West Lake Village, CA.

Instrumentation and Control Engineer, 2006 – 2009
Moshanir Power Consulting Company, Tehran, Iran.

Research Associate, 2008 – 2009
Niroo Research Institute, Tehran, Iran.

SERVICE TO PROFESSION

University Service, University of Utah

1. Undergraduate Committee, Department of Electrical and Computer Engineering, Since July 2018
2. Graduate Committee, Department of Electrical and Computer Engineering, Since October 2018
3. Teaching Excellence Committee, College of Engineering, Since June 2018
4. Interdisciplinary Programs Teaching Committee, University of Utah, Since July 2018

Peer Reviewer – Journals

IEEE Transactions on Power Systems; IEEE Transactions on Smart Grid; IEEE Systems Journal; IEEE Access; Electric Power Systems Research; Sustainable Energy, Grid, and Networks; Automatica; IET Generation, Transmission & Distribution; International Transactions on Electrical Energy Systems; Energy Economics; Energy; The Energy Journal; Energy Engineering; Utilities Policy; International Journal of Electrical Power and Energy Systems

Peer Reviewer – Conferences

IFAC Conferences, Hawaii International Conference on System Sciences, IEEE PES General Meeting

Leadership

IEEE Student Chapter Graduate Student Liaison, January 2011 – August 2012
Penn State University (Outstanding New Student Organization of the Year 2011-2012)

PROFESSIONAL MEMBERSHIPS

IEEE, since 2006
INFORMS, since 2014
MOS, Since 2015
ESIG, Since 2018
IAEE/USAEE, 2011-2013