

Mohammad E. Khodayar, Ph.D.

CONTACT INFORMATION Robert W. Galvin Center for Electricity Innovation Phone: (312) 720-7888
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RESEARCH INTERESTS

- Microgrid operation and planning
- Stochastic modeling of power systems with intermittent renewable sources
- Large scale optimization
- Smart grid applications

ACADEMIC APPOINTMENTS **Postdoctoral Researcher** **September 2012 - Present**
Robert W. Galvin Center for Electricity Innovation

- “The perfect prototype for the Illinois Institute of Technology”
 - Department of Energy (Grant #DE-FC26-08NT02875)
 - PI: Professor Mohammad Shahidehpour

EDUCATION **ILLINOIS INSTITUTE OF TECHNOLOGY, CHICAGO, IL**
Ph.D., Electrical and Computer Engineering, July 2012
Dissertation Title: *Coordination of Storage with Renewable Energy Resources in Power Systems*
Adviser: Prof. Mohammad Shahidehpour
Area of Study: Power Systems

SHARIF UNIVERSITY OF TECHNOLOGY, TEHRAN, IRAN
M.S., Electrical Engineering, January 2006
Dissertation Title: *Generation Expansion Planning of Renewable Energy Resources as Distributed Generation in Restructured Power Systems*
Adviser: Professor Mehdi Ehsan
Area of Study: Power Systems

TEHRAN POLYTECHNIC, TEHRAN, IRAN
B.S., Electrical Engineering, May 2003
Dissertation Title: *Modeling of Biological Cells Exposed to Pulsed Electric Fields Using Finite Element Methods*
Adviser: Professor Behrooz Vahidi
Area of Study: Power Systems

TECHNICAL PUBLICATIONS REFEREED JOURNAL PUBLICATIONS

[J9] M. E. Khodayar, L. Wu, and M. Shahidehpour, “Hourly coordination of electric vehicle operation and volatile wind power generation in SCUC,” *IEEE Transactions on Smart Grid*, vol. 3, no. 3 pp. 1271-1279 Sept. 2012.

[J8] L. V. Abreu, M. E. Khodayar, and M. Shahidehpour, “Risk constrained coordination of cascaded hydro units with volatile wind power generation,” *IEEE Transactions on Sustainable Energy*, vol. 3, no. 3, pp. 359-368, Jul. 2012.

- [J7] M. E. Khodayar, M. Barati, and M. Shahidehpour, "Integration of high reliability distribution systems in microgrid operation," *IEEE Transactions on Smart Grid*, vol. 3, no. 4, pp.1997-2006, Dec. 2012.
- [J6] M. E. Khodayar, and M. Shahidehpour, "Stochastic price-based coordination of intrahour wind energy and storage in a generation company," *IEEE Transactions on Sustainable Energy*, in press.
- [J5] M. E. Khodayar, A. Rahimi-Kian, and M. Ehsan, "Generation expansion planning of stand-alone micro-power systems under uncertainty using advanced planning methodology," *Energy Exploration & Exploitation, Multi-Science*, vol. 26, no. 4, pp. 221-239, Aug. 2008.
- [J4] M. E. Khodayar, L. Wu, and Z. Li, "Electric vehicle mobility in transmission-constrained hourly optimal generation scheduling," *IEEE Transactions on Smart Grid*, in press.
- [J3] M. E. Khodayar, M. Shahidehpour, and L. Wu, "Enhancing the dispatchability of variable wind generation by coordination with pumped storage hydro units in stochastic power systems," *IEEE Transactions on Power Systems*, in press.
- [J2] M. E. Khodayar, L. V. Abreu, and M. Shahidehpour, "Transmission security-based coordination of wind and pumped-storage hydro units," *IET Generation, Transmission and Distribution* in press.
- [J1] H. Wu, M. Shahidehpour, M. E. Khodayar, "Hourly demand response in day-ahead scheduling for reducing generating unit ramping cost," *IEEE Transaction on Power Systems* in press.
- [L1] M. E. Khodayar, M. Shahidehpour, "Optimal Strategies for Multiple Participants in Electricity Markets," *IEEE Power Engineering Letters* in press.

CONFERENCE PUBLICATIONS

- [C9] M. Shahidehpour, M. E. Khodayar, M. Barati, "Campus microgrid: high reliability for active distribution systems," in *Proc. IEEE Power and Energy Society General Meeting*, San Diego, CA, Jul. 2012.
- [C8] M. Shahidehpour, M. E. Khodayar, "Coordination of wind and pumped-storage hydro units for managing transmission security," in *Proc. IEEE Power and Energy Society General Meeting*, San Diego, CA, Jul. 2012.
- [C7] M. E. Khodayar, M. Ehsan, A. Rahimikian, S. Kamalinia, and E. Abbasi, "A robust decision making framework for generation expansion planning of grid connected micro-power systems," in *Proc. Large Engineering Systems Conference on Power Engineering (LESCOPE)*, Montreal, Canada, Oct. 2007.
- [C6] M. E. Khodayar, S. Afsharnia, M. Ehsan, S. Kamalinia, and M. Sedighzadeh, "Generation expansion planning of stand-alone micro-power systems using MADM techniques," in *Proc. 42nd International Universities Power Engineering Conference (UPEC)*, Brighton, UK, Sept. 2007.

- [C5] S. Kamalinia, M. E. Khodayar, S. Afsharnia, A. Rahimikian, and M. A. Sharbafi, "System optimal planning using multi attribute decision making and genetic algorithm based approach with distributed generation," in *Proc. GCC CIGRE's Leading Electric Power Conference & Exhibition in Gulf Region*, Dubai, UAE, 2007.
- [C4] Y. Alinejad-Beromi, M. Sedighizadeh, M. R. Bayat, and M. E. Khodayar, "Using genetic algorithm for distributed generation allocation to reduce losses and improve voltage profile," in *Proc. 42nd International Universities Power Engineering Conference (UPEC)*, Brighton, UK, Sept. 2007.
- [C3] S. Kamalinia, S. Afsharnia, M. E. Khodayar, A. Rahimikian, and M. A. Sharbafi, "A combination of MADM and genetic algorithm for optimal DG allocation in power systems," in *Proc. 42nd International Universities Power Engineering Conference (UPEC)*, Brighton, UK, Sept. 2007.
- [C2] S. Kamalinia, S. Afsharnia, A. Rahimikian, M. E. Khodayar, Y. Alinejad-Beromi, and M. Sedighizadeh, "Electricity market regulations and tariffs impacts on distributed generation in Iran," in *Proc. 42nd International Universities Power Engineering Conference (UPEC)*, Brighton, UK, Sept. 2007.
- [C1] M. Sanaye-Pasand, M. R. Dadashzadeh, and M. E. Khodayar, "Limitation of transmission line switching overvoltages using switchsync relays," in *Proc. International Conference on Power System Transients (IPST)*, Montreal, Canada, Jul. 2005.

RESEARCH
EXPERIENCE

ILLINOIS INSTITUTE OF TECHNOLOGY,
CHICAGO, IL

January 2009-Present

- Distributed Energy Resources and Microgrids
- Integration of Plug-in Hybrid Electric Vehicles in Smart Grids
- Reliability Evaluation of Electric Power Systems
- High Reliability Distribution Systems
- Coordination of Storage Technologies with Renewable Energy Resources
- Integrating Storage Facilities in Distribution Systems
- Demand Response and Smart Distribution Systems

Funding Sources:

- NSF Grant ECCS-0801853
- U.S. Department of Energy Grant DE-EE 0002979
- U.S. Department of Energy Grant DE-EE 0001380.000
- U.S. Department of Energy Grant DE-FC26-08NT02875

SHARIF UNIVERSITY OF TECHNOLOGY,
TEHRAN, IRAN

September 2003 - January 2006

- Generation Expansion Planning of Renewable Energy Resources
- Decision Support Systems and Decision Making Techniques
- Operation and Control of Micro-power Systems
- Robust Decision Making Framework
- Risk Analysis and Management

TEACHING
EXPERIENCE

ILLINOIS INSTITUTE OF TECHNOLOGY, CHICAGO, IL

Teaching Assistant

September 2009 – Present

- ECE 561: Deregulated Power Systems, Fall 2012
 - Responsible for course materials, exams and grading weekly assignments
- ECE 553: Power System Planning, Spring 2012
 - Responsible for course materials, exams and grading weekly assignments
- ECE 582: Microgrid Operation and Design, Fall 2011
 - Served as guest lecturer and responsible for course materials, exams and grading weekly assignments
- ECE 556: Power Market Economics and Security, Fall 2011
 - Graded weekly assignments
- ECE 319: Fundamentals of Power Engineering, Spring 2011
 - Responsible for supervision of 3-hour laboratory and grading weekly assignments
- ECE 581: Elements of Smart Grid, Fall 2010
 - Responsible for course materials, exams and grading weekly assignments
- ECE 558: Power System Reliability, Fall 2010
 - Graded weekly assignments and exams
- ECE 211-218: Analogue and Digital Circuit Analysis Laboratory I, Fall 2009
 - Responsible for supervision of 3-hour laboratory, and grading weekly assignments

AZAD UNIVERSITY OF SAVEH, SAVEH, IRAN

Guest Lecturer

January 2006 - January 2009

- Circuit Analysis
- Fundamentals of Electrical Engineering
- Power System Analysis
- Electric Machinery

SHARIF UNIVERSITY OF TECHNOLOGY, TEHRAN, IRAN

Teaching Assistant

September 2003 - January 2006

- Electric Machinery
- Power System Analysis

UNIVERSITY OF TEHRAN, TEHRAN, IRAN

Teaching Assistant

January 2007 - May 2007

- Economic and Management of Energy Systems

EXPERIENCE WITH
PROJECT
DEVELOPMENT

ROBERT W. GALVIN CENTER FOR ELECTRICITY INNOVATION, CHICAGO, IL

Senior Research Associate

September 2012 to Present

- Developed master controller algorithm and software for automation and optimization of the campus microgrid
- Developed Data Acquisition (DAQ) software for Perfect Power Systems
- Developed Distribution Management System (DMS) for medium voltage power grids

MOSHANIR POWER ENGINEERING CONSULTANTS, TEHRAN, IRAN

Power System Analyst

September 2003 - January 2009

- Feasibility Studies in Generation and Transmission
- Short Circuit Level Reduction in HV Substation
- Switching and Transient Analysis
- Short Circuit and Transient Stability Analysis
- Voltage Regulation Studies

FARDANO ENGINEERING CONSULTANTS, TEHRAN, IRAN

Electrical Engineer

March 2001 - January 2003

- Electrical Installation Design for Residential Complexes
- Electrical Installation Design for Medical Centers

PROFESSIONAL SERVICES

REVIEWER

- Journals
 - IEEE Transactions on Power System
 - IEEE Transactions on Power Delivery
 - IEEE Transactions on Vehicular Technology
 - IEEE Transactions on Sustainable Energy
 - IEEE Transactions on Smart Grid
 - IEEE Power Engineering Letters
 - Optimization and Engineering
- Conferences
 - 3rd IEEE PES Conference on Innovative Smart Grid Technologies (ISGT) 2012
 - 7th Vehicle Power and Propulsion Conference (VPPC'11)
 - 1st IEEE PES Conference on Innovative Smart Grid Technologies (ISGT) 2010

AWARDS

ILLINOIS INSTITUTE OF TECHNOLOGY, CHICAGO, IL

- Grainger Fellowship 2012

PROFESSIONAL MEMBERSHIP

- Institute of Electrical and Electronics Engineering (IEEE), Member, 2009-Present
 - IEEE Power Engineering Society (PES), Member, (2010- Present)
- Eta Kappa Nu, Electrical Engineering Honor Society (HKN), Lifetime Member

SOFTWARE SKILLS

- Power System Analysis Software: PSS/E, ETAP, DigSILENT, CYME/PSAF
- Power System Transient Analysis Software: EMTP-RV, PSCAD
- Instrumentation, Control, Data Acquisition and Measurement: LabVIEW
- Distribution Management System: E-Terra Distribution Management System
- Optimization: GAMS, AIMMS
- Computer Programming: C++, MATLAB