







Seyyed Ali Pourmousavi Kani, Ph.D.

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North Terrace campus
The University of Adelaide
Adelaide SA 5005 Australia

Education

- | | |
|-----------|---|
| 2009–2014 | Ph.D., Electrical Engineering (emphasis on power systems)
Montana State University, USA

Dissertation: <i>Power Management and Frequency Regulation for Microgrid and Smart Grid– A Real-Time Demand Response Approach</i> |
| 2005–2008 | M.Sc., Electrical Engineering (emphasis on power systems)
Amirkabir University of Technology (Tehran Polytechnic), Iran

Thesis: <i>Optimal Operation of a Wind/PV/Super-Capacitor Hybrid Energy System with Very Short-Term Wind Speed and Solar Irradiation Forecasting</i> |
| 2000–2005 | B.Sc., Electrical Engineering (emphasis on power systems)
University of Mazandaran, Iran

Final Project: <i>Dynamic Simulation of Three Different Speed Control Techniques for DC Motors</i> |

Professional Appointments

- | | |
|------------------------|---|
| June 2019
Present | Lecturer , School of Electrical and Electronic Engineering (EEE), the University of Adelaide (UofA). |
| Mar. 2017
May 2019 | Research Fellow , School of Information Technology and Electrical Engineering (ITEE), University of Queensland (UQ). |
| Jan. 2017
Mar. 2017 | Postdoc , Department of Applied Mathematics and Computer Science, Technical University of Denmark (DTU). |
| Sep. 2015
Dec. 2016 | Researcher , Energy Management department, NEC Laboratories America, Inc. |
| Nov. 2014
Sep. 2015 | Postdoctoral Scientist , Energy Management department, NEC Laboratories America, Inc. |

¹<https://scholar.google.com/citations?user=XoHCLowAAAAJ>

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³<http://publons.com/a/482965/>

⁴<http://alipourmousavi.com/>

May 2014 Nov. 2014	Power System Engineering Specialist , Market Engineering Support group, California ISO (CAISO)
May 2011 Aug. 2011	Summer Research Assistant , Energy Management department, NEC Laboratories America, Inc.
May 2009 May 2014	Graduate Research Assistant , Electrical and Computer Engineering department, Montana State University
Sep. 2006 May 2008	Graduate Research Assistant , Electrical Engineering department, Amirkabir University of Technology (Tehran Polytechnic)

Honors & Awards

Nov. 2015	Spot Recognition Award , NEC Laboratories America, Inc. For successful development & demonstration of the battery degradation model for Microgrid management solution
Jul. 2015	Iranian Elite National Talent Recognition , the Iran's National Elites Foundation (INEF), Office of Presidency of Islamic Republic of Iran. For exceptionally high intellectual achievements, academic aptitude, and creative ability
March 2015	Spot Recognition Award , NEC Laboratories America, Inc. For establishing NECLA's expertise in grid-scale storage technologies
May 2014	Don Pierre Graduate Student Publication Award , Montana State University For the best journal paper of the year at the ECE department for paper [J5]
May 2011	Don Pierre Graduate Student Publication Award , Montana State University For the best journal paper of the year at the ECE department for paper [J1]
Nov. 2008	High honor and top-ranked recognition Office of Honor Students, Amirkabir University of Technology (Tehran Polytechnic) For achieving 2 nd place in the class in total GPA
Dec. 2005	High honor and top-ranked recognition Office of Honor Students, University of Mazandaran For achieving 1 st place in the class in total GPA

Research Interests

Current	Optimal sizing and operation of distributed batteries, battery degradation modelling, thermal modelling of large-scale battery systems, bulk power system operation and electricity market, optimal energy management with stacked battery operation, voltage and frequency regulation
Past	real-time demand response, wind speed and power forecasting, microgrid power management, dynamic modeling of power system and different components

Research Funding and Grants

\$36K 2019	<i>Research Infrastructure Grant</i> School of Electrical and Electronic Engineering, The University of Adelaide, Australia.
\$82K 2019	<i>PhD Scholarship Grant</i> School of Electrical and Electronic Engineering, The University of Adelaide, Australia.

Patents

- [P6] **S. A. Pourmousavi**, M. Parandehgheibi, Kiyoshi Nakayama, and Ratnesh K. Sharma. A Two-Layer Incentive-Based Controller for Aggregating BTM Energy Storage Devices. *Under preparation by the legal team*, 2016
- [P5] Ali Hooshmand, **S. Ali, Pourmousavi**, Ratnesh Sharma, and Shankar Mohan. Optimal battery sizing for behind-the-meter applications considering participation in demand response programs and demand charge reduction, September 7 2017. US Patent App. 15/416,810
- [P4] **S. Ali, Pourmousavi**, Babak Asghari, and Ratnesh Sharma. Resilient battery charging strategies to reduce battery degradation and self-discharging, August 10 2017. US Patent App. 15/363,876
- [P3] **S. Ali, Pourmousavi**, Ratnesh Sharma, and Babak Asghari. Innovative framework combining cycling and calendar aging models, April 27 2017. US Patent App. 15/336,725
- [P2] **S. Ali, Pourmousavi**. Data-driven battery aging model using statistical analysis and artificial intelligence, February 4 2016. US Patent App. 15/015,377
- [P1] Ratnesh Sharma, Babak Asghari, and **S. Ali, Pourmousavi**. Method for real-time power management of a grid-tied microgrid to extend storage lifetime and reduce cost of energy, April 28 2015. US Patent 9,020,649

Books

- 2009 | **S. Ali. Pourmousavi**. *Electrical Circuits I&II: Solution Manual*. Payam Daneshgahi press, 320 pages. (In Farsi)

Book Chapter

- 2018 | **S. Ali. Pourmousavi**, F. Shahnia, Md. Imran Azim, G.M. Shafiullah, and Md. Asaduzzaman Shoeb. “Chapter 2: Microgrid Control Overview” in “*Variability, Scalability, and Stability of Microgrids*”, IET. (Under production)

Journal Publications

- [J17] Md Mehedi Hasan , **S. Ali Pourmousavi**, and Tapan K. Saha. A data-driven approach to estimate battery cell temperature using NARX neural network model. Submitted for review to the *Electric Power Systems Research*, Apr. 14, 2019
- [J16] Umer Akram, N. Mithulananthan, Rakibuzzaman Shah, and **S. Ali Pourmousavi**. An analytical approach for sizing of energy storage for inertial support and primary frequency regulation. Submitted for review to the *IEEE Transactions on Sustainable Energy*, Mar. 24, 2019
- [J15] **S. Ali Pourmousavi** and Tapan K. Saha. On the battery efficiency and degradation modelling in sizing and management studies. Submitted for review to the *Electric Power Systems Research*, Mar. 8, 2019
- [J14] G. De Zotti, **S. Ali Pourmousavi**, J. M. Morales, H. Madsen, and N.K. Poulsen. A control-based method to meet TSO and DSO ancillary services needs by flexible end-users. Submitted for review to the *IEEE Transactions on Power Systems*, Dec. 23, 2018
- [J13] **S. Ali Pourmousavi**, P. Wild, and Tapan K. Saha. Improving predictability of renewable generation through optimal battery sizing. Accepted for publication in the *IEEE Transactions on Sustainable Energy*, Nov. 23, 2018.

- [J12] G. De Zotti, **S. A. Pourmousavi**, J. M. Morales, H. Madsen, and N. K. Poulsen. Consumers' flexibility estimation at the tso level for balancing services. *IEEE Transactions on Power Systems*, 34(3):1918–1930, May 2019
- [J11] **S. Ali. Pourmousavi** and Tapan Kumar Saha. Evaluation of the battery operation in ramp-rate control mode within a PV plant: A case study. *Solar Energy*, 166:242 – 254, 2018
- [J10] G. De Zotti, **S. Ali. Pourmousavi**, H. Madsen, and N. Kjølstad Poulsen. Ancillary services 4.0: A top-to-bottom control-based approach for solving ancillary services problems in smart grids. *IEEE Access*, 6:11694–11706, 2018
- [J9] Mousa Marzband, Masoumeh Javadi, **S. Ali, Pourmousavi**, and Gordon Lightbody. An advanced retail electricity market for active distribution systems and home microgrid interoperability based on game theory. *Electric Power Systems Research*, 157:187 – 199, 2018
- [J8] Reza Ahmadi Kordkheili, **S. Ali, Pourmousavi**, Mehdi Savaghebi, Josep M Guerrero, and Mohammad Hashem Nehrir. Assessing the potential of plug-in electric vehicles in active distribution networks. *Energies*, 9(1):34, 2016
- [J7] **S. Ali, Pourmousavi**, M Hashem Nehrir, and Ratnesh K Sharma. Multi-timescale power management for islanded microgrids including storage and demand response. *IEEE Transactions on Smart Grid*, 6(3):1185–1195, 2015
- [J6] **S. Ali, Pourmousavi**, Stasha N Patrick, and M Hashem Nehrir. Real-time demand response through aggregate electric water heaters for load shifting and balancing wind generation. *IEEE Transactions on Smart Grid*, 5(2):769–778, 2014
- [J5] **S. Ali, Pourmousavi** and M Hashem Nehrir. Introducing dynamic demand response in the LFC model. *IEEE Transactions on Power Systems*, 29(4):1562–1572, 2014
- [J4] **S. Ali, Pourmousavi** and M Hashem Nehrir. Real-time central demand response for primary frequency regulation in microgrids. *IEEE Transactions on Smart Grid*, 3(4):1988–1996, 2012
- [J3] **S. Ali, Pourmousavi** and MM Ardehali. Very short-term wind speed prediction: a new artificial neural network–Markov chain model. *Energy Conversion and Management*, 52(1):738–745, 2011
- [J2] **S. Ali, Pourmousavi**, GH Riahy, and D Mazhari. An innovative hybrid algorithm for very short-term wind speed prediction using linear prediction and Markov chain approach. *International journal of green energy*, 8(2):147–162, 2011
- [J1] **S. Ali, Pourmousavi**, M Hashem Nehrir, Christopher M Colson, and Caisheng Wang. Real-time energy management of a stand-alone hybrid wind-microturbine energy system using particle swarm optimization. *IEEE Transactions on Sustainable Energy*, 1(3):193–201, 2010

Conference Publications

- [C30] Md Mehedi Hasan, **S. Ali Pourmousavi**, and Tapan K. Saha. Battery cell temperature estimation model and cost analysis of a grid-connected PV-BESS plant. Accepted for presentation in the *IEEE PES ISGT Asia*, Chengdu, China, May 21-24, 2019
- [C29] Giulia De Zotti, Daniela Guericke, **S. Ali Pourmousavi**, Juan Miguel Morales, Henrik Madsen, and Niels K. Poulsen. Analysis of rebound effect modelling for flexible electrical consumers. Accepted for presentation in the *IFAC Workshop on Control of Smart Grid and Renewable Energy Systems*, Jeju, Republic of Korea, June 10-12, 2019

- [C28] M. Imran Azim, **S. Ali Pourmousavi**, Wayes Tushar, and Tapan K. Saha. Feasibility study of a P2P energy trading algorithm in a grid-tied power network. Accepted for presentation in the *PES General Meeting*, Atlanta, USA, Aug. 4-8, 2019
- [C27] **S. Ali, Pourmousavi**, P. Wild, F. Bai, R Yan, TK Saha, , and D Eghbal. Learning from a 3.275 MW utility-scale PV plant project: Update and new remarks. In *Proceedings of the CIGRE Paris Conference*, 2018
- [C26] Giulia De Zotti, **S. Ali, Pourmousavi**, Henrik Madsen, Niels Kj, et al. Utilizing flexibility resources in the future power system operation: Alternative approaches. In *2018 IEEE International Energy Conference (ENERGYCON)*, pages 1–6. IEEE, 2018
- [C25] Yelena Vardanyan, Frederik Banis, **S. Ali, Pourmousavi**, and Henrik Madsen. Optimal coordinated bidding of a profit-maximizing EV aggregator under uncertainty. In *2018 IEEE International Energy Conference (ENERGYCON)*, pages 1–6. IEEE, 2018
- [C24] **S. Ali Pourmousavi**, and Tapan K. Saha. Learning from an operational utility-scale Li-Polymer battery system in a PV plant. Presented at the *EECON*, Brisbane, Australia, Apr. 2018
- [C23] M. M. Hasan, **S. Ali. Pourmousavi**, F. Bai, and T. K. Saha. The impact of temperature on battery degradation for large-scale BESS in PV plant. In *2017 Australasian Universities Power Engineering Conference (AUPEC)*, pages 1–6, Nov 2017
- [C22] M. Parandehgheibi, **S. Ali. Pourmousavi**, K. Nakayama, and R. K. Sharma. A two-layer incentive-based controller for aggregating BTM storage devices based on transactive energy framework. In *2017 IEEE Power Energy Society General Meeting*, pages 1–5, July 2017
- [C21] **S. Ali, Pourmousavi.**, M. Behrangrad, A. Jahanbani Ardakani, and M. Hashem Nehrir. Ownership Cost Calculations for Distributed Energy Resources Using Uncertainty and Risk Analyses. *ArXiv e-prints*, September 2017
- [C20] Shankar Mohan, Ali Hooshmand, **S. Ali, Pourmousavi**, and Ratnesh Sharma. BSS sizing and economic benefit analysis in grid-scale application. In *Innovative Smart Grid Technologies Conference (ISGT), 2016 IEEE Power & Energy Society*, pages 1–5. IEEE, 2016
- [C19] **S. Ali, Pourmousavi**, Babak Asghari, and Ratnesh K Sharma. A novel algorithm to integrate battery cyclic and calendar agings within a single framework. In *Innovative Smart Grid Technologies Conference (ISGT), 2016 IEEE Power & Energy Society*, pages 1–5. IEEE, 2016
- [C18] **S. Ali, Pourmousavi**, Mahdi Behrangrad, M Hashem Nehrir, and Ali Jahanbani Ardakani. LFC model for multi-area power systems considering dynamic demand response. In *Transmission and Distribution Conference and Exposition (T&D), 2016 IEEE/PES*, pages 1–5. IEEE, 2016
- [C17] Reza Ahmadi Kordkheili, **S. Ali, Pourmousavi**, Jayakrishnan R Pillai, Hany M Hasanien, Birgitte Bak-Jensen, and M Hashem Nehrir. Optimal sizing and allocation of residential photovoltaic panels in a distribution network for ancillary services application. In *Optimization of Electrical and Electronic Equipment (OPTIM), 2014 International Conference on*, pages 681–687. IEEE, 2014
- [C16] Kevin Marchese, **S. Ali, Pourmousavi**, and MH Nehrir. The application of demand response for frequency regulation in an islanded microgrid with high penetration of renewable generation. In *North American Power Symposium (NAPS), 2013*, pages 1–6. IEEE, 2013
- [C15] **S. Ali, Pourmousavi**, AS Cifala, and MH Nehrir. Impact of high penetration of PV generation on frequency and voltage in a distribution feeder. In *North American Power Symposium (NAPS), 2012*, pages 1–8. IEEE, 2012

- [C14] AJ Litchy, C Young, **S. Ali, Pourmousavi**, and MH Nehrir. Technology selection and unit sizing for a combined heat and power microgrid: Comparison of WebOpt and HOMER application programs. In *North American Power Symposium (NAPS), 2012*, pages 1–6. IEEE, 2012
- [C13] **S. Ali, Pourmousavi** and Mohammad Hashem Nehrir. Real-time optimal demand response for frequency regulation in smart μ grid environment, 2012
- [C12] **S. Ali, Pourmousavi**, Ratnesh K Sharma, and Babak Asghari. A framework for real-time power management of a grid-tied microgrid to extend battery lifetime and reduce cost of energy. In *Innovative Smart Grid Technologies (ISGT), 2012 IEEE PES*, pages 1–8. IEEE, 2012
- [C11] **S. Ali, Pourmousavi**, MH Nehrir, and C Sastry. Providing ancillary services through demand response with minimum load manipulation. In *North American Power Symposium (NAPS), 2011*, pages 1–6. IEEE, 2011
- [C10] **S. Ali, Pourmousavi** and MH Nehrir. Demand response for smart microgrid: Initial results. In *Innovative Smart Grid Technologies (ISGT), 2011 IEEE PES*, pages 1–6. IEEE, 2011
- [C9] CM Colson, MH Nehrir, and **S. Ali, Pourmousavi**. Towards real-time microgrid power management using computational intelligence methods. In *Power and Energy Society General Meeting, 2010 IEEE*, pages 1–8. IEEE, 2010
- [C8] **S. Ali, Pourmousavi** and GH Riahy. A new ANN-based methodology for very short-term wind speed prediction using Markov chain approach. In *Electric Power Conference, 2008. EPEC 2008. IEEE Canada*, pages 1–6. IEEE, 2008
- [C7] **S. Ali, Pourmousavi**, SM Mousavi, A Kashefi Kaviani, and GH Riahy. Very short-term wind speed prediction using linear regression among ANN and Markov chain. In *The International Conference on Power System Analysis, Control and Optimization (PSACO-2008)*, 2008
- [C6] E Safavieh, A Jahanbani Ardakani, A Kashefi Laviani, **S. Ali, Pourmousavi**, SH Hosseinian, and M Abedi. A new integrated approach for very short-term wind speed prediction using wavelet networks and PSO. In *Proceedings of the International Conference on Power Systems*, 2007
- [C5] A Jahanbani Ardakani, A Kashefi Kavyani, **S. Ali, Pourmousavi**, SH Hosseinian, and M Abedi. Siting and sizing of distributed generation for loss reduction. *International Conference on Power Systems*, pages 1–6, 2007
- [C4] **S. A. Pourmousavi**, A. Jahanbani Ardakani, A. Kashefi Kaviani, and G. H. Riahy. Short-term wind speed prediction using MLP Neural Networks trained by PSO algorithm in wind turbine applications. In *Proc. of 22nd International Power System Conference (PSC'07)*, Nov. 19-21, Tehran, Iran 2007 (IN FARSI)
- [C3] **S. Ali, Pourmousavi** and Nima Farrokhzad Ershad. Annual electricity demand prediction for iranian agriculture sector using ANN and PSO. In *Electrical Power Conference, 2007. EPC 2007. IEEE Canada*, pages 446–451. IEEE, 2007
- [C2] A. Kashefi Kaviani, **S. A. Pourmousavi** and A. Jahanbani Ardakani. Multi-layer Artificial Neural Networks' training using PSO algorithm. In *Proc. of 1st Joint Congress on fuzzy and Intelligent Systems (FIS'07)*, Aug. 30-31, Mashhad, Iran 2007 (IN FARSI)
- [C1] Nima Farrokhzad Ershad and **S. A. Pourmousavi**. Dynamic modeling and simulation of a PEMFC for DG Applications. In *Proc. of 6th Iranian Energy Symposium*, Jul. 23-25, Tehran, Iran 2007 (IN FARSI)

Research/Professional Experience

- June 2019
Present **Lecturer** at the school of Electrical and Electronic Engineering (EEE)
University of Adelaide, SA, Australia
- Working on Future Battery Industry CRC
- Mar. 2017
May 2019 **Research Fellow** at the school of Information Technology and Electrical Engineering (ITEE)
University of Queensland, St Lucia, St Lucia, Australia
- Worked on the UQ Gattton Solar Research Facility on 3.275 MWp PV plant and 600 kW/760 kWh onsite battery storage
 - Developed innovative research on battery and integration to the grid, funding proposals, and supervised PhD/Masters by research/Masters by coursework students projects
- Jan. 2017
Mar. 2017 **Postdoc** at the Department of Applied Mathematics and Computer Science (DTU Compute)
Technical University of Denmark (DTU), Lyngby, Denmark
- Led development of work package 6 (called “Integrated energy system assessment tools”) in a grant proposal (called “Flexibility Services and Activating Consumers in a Renewables Based Electricity System - Modeling, Market Design and Business Models (FLEX-ACES)”) by leading scientists from University of Newcastle, Aalborg University, TU-Berlin, and DIW-Berlin. Application was submitted to LCE-05-2017 call by the European Commission – Horizon 2020. While the application has been well-received by the reviewers, it couldn’t make to the final list of winners.
 - Worked on work packages 2, 4, and 5 of the SmartNet project (<http://smartnet-project.eu/>) to provide tools for optimal interactions among TSO and DSOs in a massive renewable generation environment, funded by LCE-6-2015 Research and Innovation Actions call, €12.657.928,00 funded by the European Commission – Horizon 2020
 - Collaboration with a postdoc fellow on EV’s battery modelling for optimal aggregation problem, and co-supervising a Ph.D. student in line with SmartNet project
- Sep. 2015
Sep. 2016 **Researcher** at the Energy Management Department
NEC Laboratories America, Cupertino, CA, USA
- Developed and assessed Li-Ion battery degradation model based on mechanical fatigue analysis and incremental capacity analysis (ICA) on the experimental data, provided by our industrial partner
 - Proposed and implemented new MILP objective functions and constraints in the energy management system (EMS) using GLPK[®] to improve battery life cycle by controlling its charging and discharging levels
 - Developed a new approach integrating battery degradation model in the EMS for grid-tied and islanded microgrids
 - Co-supervised and actively participated in a project to design an algorithm for optimal battery sizing in behind-the-meter (BTM) applications considering its lifetime, energy and demand charge reduction, and ability to participate in demand response programs (DRPs) by formulating a novel MILP optimization formulation for event and non-event days in GLPK[®] package. Our algorithm is implemented in the NEC Energy Solutions DSS battery https://www.neces.com/assets/DSS_V010918N.pdf
 - Developing an analytical algorithm (mechanical fatigue model) for Li-Ion battery degradation to improve stability in battery capacity estimation
 - Working on failure modeling and analysis of a microgrid at device level to improve resiliency of the system
 - Involved in hiring, defining project, and coaching postdoctoral scientists and interns at NECLA

- Nov. 2014 **Postdoctoral Scientist** at the Energy Management Department
 Sep. 2015 *NEC Laboratories America, Cupertino, CA, USA*
- Battery sizing for an islanded Microgrid in the presence of large PV generation and multiple diesel generators considering battery lifetime for an Australian mining site and a banana field in Indonesia using GLPK[®] and Gurobi[®] optimization packages
 - Conducted comprehensive statistical analyses (*p-statistics* and *null-hypothesis test*, *ridge* and *lasso* regressions and so on) to determine the most significant parameters in the battery cyclic and calendar ageings
 - Developed a new ANN-based model of battery degradation for cyclic and calendar ageings individually
 - Proposed and implemented a novel algorithm to integrate cyclic and calendar ageing models of any type in a single framework to improve battery capacity estimation
 - Designed a comprehensive MATLAB[®]-based toolbox for battery cyclic and calendar ageing training and testing for a client
- May. 2014 **Power System Engineering Specialist** at the Market Engineering Support (MES) group
 Oct. 2014 *California ISO (CalISO), Folsom, CA, USA*
- Worked on complex engineering, market, and optimization assignments
 - Provided expertise on studies and acted as project coordinator in the design, engineering, and testing of market software
 - Involvement in design considerations and implementations of advanced power technologies to fully utilize the market operations and reliability of the grid through the use of power system
 - Supported grid operators to analyze and explain unit commitment and dispatches continuously and promptly fix and correct any system issues and/or find a workaround to keep operations running reliably
 - Integrating, enhancing, improving, testing, and supporting Day-Ahead Market (DAM), Real-Time Market (RTM), Market Quality Services (MQS) applications
 - Performed all functional testing of existing applications and new features added in the domain of the DAM, the RTM, and the MQS
 - Ensured complete and accurate documentation of implemented application or modification is developed and maintained to provide permanent records or system component and backup material with a focus on adherence to requirements and compatibility of all segments of the project including the quality of the work done by others
- May. 2009 **Graduate Research Assistant** at the Electrical and Computer Engineering department
 May. 2014 *Montana State University, Bozeman, MT, USA*
- This collaborative position included microgrid design, modeling, optimal power/energy management, novel frequency and voltage regulation controller development, providing written summaries for journal and conference publications and presentations, and mentoring multiple M.S. students in collaboration with Prof. Nehrir.
 - Grid-tied and islanded Microgrid optimal design using HOMER[®] and WebOpt[®] software packages with different renewable generation sources (such as the wind and solar PV) and storage devices (such as VRLA batteries, solid-oxide and PEM fuel cells)
 - Conducted detailed dynamic model of generation sources (e.g., wind, solar PV), storage devices (e.g., VRLA batteries and SOFC and PEMFC), and responsive loads (e.g., electric water heaters (EWHs)) in MATLAB/Simulink[®] and PSCAD[®]

- Enhanced load frequency control (LFC) model for dynamic small-signal stability studies at transmission level by adding DR loop to the original model in MATLAB/Simulink[®]
- Proposed and verified novel real-time optimal power/energy management for islanded microgrid in presence of renewable generation on small and medium size microgrid in MATLAB/Simulink[®] and m-files
- Evaluated the impact of different PV penetration level at distribution feeder and proposed a DR control strategy to overcome large frequency and voltage variations
- Developed an EWH thermostat setpoint control strategy to provide required balancing reserve signal in a large transmission system
- Co-supervising multiple M.Sc. students by defining research topics and methodologies, designing and troubleshooting MATLAB[®] codes and simulation algorithms, and paper proof-reading

May. 2011 **Summer Research Assistant** at the Energy Management Department

Aug. 2011 *NEC Laboratories America, Cupertino, CA, USA*

- Designed a small-scale grid-tied microgrid using HOMER[®] software which included Wind, PV, diesel generator, and Battery
- Developed detailed dynamic model of the microgrid in MATLAB/Simulink[®] using SimPowerSys[®] toolbox
- Proposed a novel Li-Ion battery operational cost model based on engineering economic analysis and battery lifetime model in MATLAB/m-files[®]
- Designed an optimal real-time power management strategy for cost reduction and battery lifetime extension for the designed microgrid in MATLAB/Simulink[®]

Sep. 2006 **Graduate Research Assistant** at the Electrical Engineering Department

May. 2008 *Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran*

- Designed an intelligent control algorithm based on very short-term wind speed prediction for wind turbines in an islanded microgrid with solar PV and super-capacitor
- Implemented detailed dynamic model of the wind turbine and induction generator, PV solar panels, super-capacitor and their power electronic interfaces in MATLAB/Simulink[®]
- Simulated a four-quadrant DC-DC copper and a PI controller for charging/discharging super-capacitor to partially suppress wind generation variations
- Developed multiple very short-term wind speed prediction algorithms using Markov chain, linear regression, and artificial neural network (ANN) in MATLAB/m-files[®]
- Developed a three-phase pipe-type cable model with/without earth return wire for a transient modeling software package
- Designed and implemented an ANN-based intelligent energy audit software package for energy auditing in residential and commercial buildings, using VB 6.0

Invited Talk

Feb. 2019 **Technical challenges of accommodating EVs and PHEVs in the future grid**

by the *International Workshop* on “Addressing Challenging Issues of Grids with High Penetration of Grid Connected Inverters: Towards Future and Smart Grids”

Reviewed the status of EVs and PHEVs in Australia and future projection, different standard on chargers and connection, opportunities and challenges.

- Dec. 2017** | **Energy Storage Application in Active Distribution Networks: Concept, Implementation, and Analysis**
by the *Amirkabir University of Technology (AUT)*, Iran, on behalf of the *Iran National Elites Foundation (INEF)*
Reviewed the status of small-scale PV and battery systems in Australia, and the potential applications of energy storage in the future distribution networks.
- Oct. 2017** | **Big Data Tools and Procedures in Power Systems Research**
by the *IEEE Queensland Student Chapter*, Australia
Introduced Data Science procedure and tools useful in power systems research with live demos.

Teaching Experience & Student Supervision

- Lecturer** | The University of Queensland, Australia
- Taught Electricity market module of the *Electricity Market Operation and Security (ELEC7310)* course
- TA** | Montana State University, USA
- Taught PowerWorld® in *Power System Analysis* class for a couple of semesters
 - Taught *Linear Control* class for a couple of sessions
- Lecturer** | Islamic Azad University, Iran
- Electrical Circuits and Lab
- TA** | University of Mazandaran, Iran
- Electrical Circuits I & II
 - Power System Analysis I & II
 - Differential Equation
- Ph.D. Students**
- [Emma Blomgren](#), Technical University of Denmark (DTU), 2019–Present
Current Appointment: PhD student at DTU
 - [Julian Lemos Vinasco](#), Technical University of Denmark (DTU), 2019–Present
Current Appointment: PhD student at DTU
 - [Umer Akram](#), The University of Queensland (UQ), 2018–Present
Current Appointment: PhD student at UQ
 - [Md. Imran Azim](#), The University of Queensland (UQ), 2018–Present
Current Appointment: PhD student at UQ
 - [Giulia De Zotti](#), Denmark Technical University (DTU), 2017–2019
Current Appointment: Energy Advisor at Danish Energy Agency
- Research Interns**
- [Dr. Marzieh Parandehgheibi](#), Ph.D. from Massachusetts Institute of Technology (MIT)
Current Appointment: Tech Lead/Staff AI Scientist at NIO
 - [Dr. Shankar Mohan](#), Ph.D. from University of Michigan - Ann Arbor
Current Appointment: Research Engineer at Ford Motor Company
- PhD Visiting Scholar**
- [Dr. Reza Ahmadi](#), Ph.D. from Aalborg University
Current Appointment: Wind Farm Control Lead engineer at Vattenfall-Denmark

M.S. Students	<ul style="list-style-type: none"> • Md Mehedi Hasan, The University of Queensland • Colin Young, Montana State University • Jonathan Wilson, Montana State University • Stasha Patrick, Montana State University • Aric Litchy, Montana State University • Kevin Marchese, Montana State University
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Editorship

Technical Committee	The 8 th International Conference on Renewable Power Generation 24–25 October, Shanghai, China <i>IET Renewable Power Generation</i> (ISSN: 1752-1424, IF 3.488), IET
Guest Editor	Special Issue on “Demand Response in Electricity Markets” January 2018 <i>Energies</i> (ISSN: 1996-1073, IF 2.262), MDPI

Journals Peer Reviewer

IEEE	IEEE Transactions on Power Systems, ISSN: 0885-8950 IEEE Transactions on Smart Grid, ISSN: 1949-3053 IEEE Transactions on Sustainable Energy, ISSN: 1949-3029
IET	IET Generation, Transmission and Distribution, ISSN: 1751-8695 IET Renewable Power Generation, ISSN: 1752-1424
Elsevier	Applied Energy, ISSN: 0306-2619 Electric Power Systems Research, ISSN: 0378-7796 Sustainable Energy, Grids and Networks, ISSN: 2352-4677
Taylor & Francis	Electric Power Component and Systems, ISSN: 1532-5016 International Journal of Green Energy, ISSN: 1543-5083
John Wiley & Sons	International Transactions on Electrical Energy Systems, ISSN: 2050-7038 Wind Energy, ISSN: 1099-1824
MDPI	Energies, ISSN: 1996-1073

Research Funding Resources

Feb. 2013 May 2014	Real-Time Energy Management of an Islanded Microgrid for Frequency and Voltage Regulation. <i>Sponsored by:</i> NEC Labs America, Cupertino, CA.
Sep. 2011 Feb. 2013	Making the Grid “Smart” through “Smart” Microgrids: Real-Time Power Management of Microgrids with Multiple Distributed Generation Sources Using Intelligent Control. <i>Sponsored by:</i> U.S. DOE—DE-FG02-11ER46817 Award.
May. 2010 Sep. 2012	Frequency and Voltage Regulation by DR inside of a Microgrid within a Smart Grid Environment. <i>Sponsored by:</i> Pacific Northwest National Lab (PNNL)—DE-AC05-76RL01830 Award.

June 2009	Energy Management of Islanded Hybrid Energy System using Heuristic Methods.
Apr. 2010	<i>Sponsored by:</i> Pacific Northwest National Lab (PNNL)—DE-AC05-76RL01830, and by the National Science Foundation (NSF)—ECS-0823865.

Computer Skills

Programming	MATLAB, C++, Visual Basic 6.0
Software	PSCAD, PowerWorld, MS SQL Server, MATLAB Toolboxes including Simulink, SimPowerSystem , optimization, neural network, curve fitting, control system, and graphical user interface (GUIDE), familiar with DIgSILENT, HOMER, DER-CAM, Pspice, LINGO, MotorMaster
Optimization	GLPK, Gurobi, IBM CPLEX, GAMS, Particle Swarm Optimization (PSO), Genetic Algorithm (GA)
Front-end Web	HTML/HTML5, CSS/CSS3, jQuery, AngularJS
General	Microsoft Office (Word, Excel, PowerPoint, Outlook, OneNote), L ^A T _E X

Professional Affiliation

2017–2018	Secretary, IEEE Joint Chapter of Power Electronics/Industrial Electronics/ Industry Applications Societies
Since 2007	<i>Senior Member</i> of the Power & Energy Society (PES), IEEE (S'07, M'15, SM'19)
2017–2018	MIEAust, The Institution of Engineers Australia
2017–2018	Electric Energy Society of Australia (EESA), Engineers Australia (EA)

Professional Training

2018	<p>Advanced Data Analytics for Energy Systems, by EES-UETP Consortium, Sep. 3-5, 2018 Three days workshop at INESC Technology and Science (INESC TEC) in Porto, Portugal on advanced data analytic techniques and modelling</p> <ul style="list-style-type: none"> • The future generation of big data functions will combine spatial-temporal information and distributed learning techniques that exploit recent advances in high performance and distributed computing • The output should be probabilistic (uncertainty) information and with high value for integration in decision-aid methods under risk • Deep learning techniques represent an added value for automatic feature extraction and reduction, but manual feature engineering using domain (expert) knowledge cannot be abandoned • Machine learning algorithms can be used to control grid assets, for instance embedded in reinforcement learning techniques or to create proxy models for complex physical systems • Creation of new business models for knowledge extraction from data is also expected in a near future. Some examples are data analytics for consumer engagement in demand response, big data pre-processing from grid sensors, electricity markets modelling and predictive maintenance of electrical assets
2018	<p>Research Data Science Winter School, by Australian Academy of Science, June 12-15, 2018 Four days workshop at the University of Queensland in St Lucia, Australia to teach and refresh all the basic concepts that programming depends on, and learn key considerations on working with data by engaging with experienced data scientists.</p> <ul style="list-style-type: none"> • 2 days of hands-on sessions by Software Carpentry on R programming

- 2 days of tutorial based sessions on Research Data Management, Research Computational Infrastructure and key considerations for managing, analysing and sharing your research data
- 2016 **Energy Storage: An introduction to Technologies, Applications and Best Practices**, by IEEE
One day tutorial at the IEEE PES T&D conference on the basics and state-of-the-art of bulk energy storage for power systems applications
- Basics of energy storage technologies and application
 - Cost-effective energy storage applications through bundling of grid services
 - Valuation of energy storage: Wholesale markets, distribution support and behind-the-meter
- 2016 **Internet of Things (IoT): Roadmap to Connected World**, by Massachusetts Institute of Technology (MIT)
Introduces both the broad range of IoT technologies and the most recent developments in the space, 1-month online training course with certificate upon completion
- Discover key IoT concepts including identification, sensors, localization, wireless protocols, data storage and security
 - Explore IoT technologies, architectures, standards, and regulations
 - Realize the value created by collecting, communicating, coordinating, and leveraging the data from connected devices
 - Examine technological developments that will likely shape the industrial landscape in the future
 - Understand how to develop and implement your own IoT technologies, solutions, and applications
- 2016 **Managing Chaos**, by American Management Association (AMA)
Tools to set priorities and make decisions under pressure, 2-day onsite training with certificate
- Define Chaos within your Control
 - Thinking and decision making
 - Priority planning
 - Plan daily work
 - Assertive communication
 - Action plan
- 2015 **Essentials of Project Management for Non-Project Manager**, by American Management Association (AMA)
Tools for managing your project (for non-managers), 2-day onsite training with certificate
- Getting your hands around project management
 - How to work successfully with others
 - Getting it off the ground
 - Planning the work
 - Working the plan
 - Putting it to bed

Selected Graduate Courses

- Ph.D. | • Introduction to Modern Control

- | | |
|-------|--|
| M.Sc. | <ul style="list-style-type: none"> • Electric Power Systems • Advanced Power Electronics (Inverters) • Power Electronics (DC-DC Converters) • Advanced Topics in Controls (Optimal Control) • Sequential State Estimation |
| M.Sc. | <ul style="list-style-type: none"> • Energy Storage Systems • Economic and Energy Management • Energy Resources • Renewable Energy I • Computer Applied For Power System Analysis • Distributed Generation (DG) |

Language

English	Full professional proficiency IELTS Score (taken on July 16, 2016): Listening (8.5) Reading (8.0) Speaking (8.5) Writing (8.5)
Persian (Farsi)	Native

Personal Interests

Sports	Football (Soccer), Table Tennis
Hobbies	Reading (philosophy & physics), watching movies, and listening to music, front-end web application development

References

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