Adel Nasiri, Ph.D.

CEC Distinguished Professor
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Brief Summary:

CEC Distinguished Professor, Aug 2021-present.

Interim and Founding Executive Director for Connected Systems Institute at UW-Milwaukee, Duties and Impact:

- Responsible for formulating institute mission, tasks, and plans with a focus on Industrial Internet of Things (IIOT)
- Raised about $7M to advance institute's goals and objectives
- Leading the planning for the institute educational programs including a planned joint MS program, certificates, courses, and professional training
- Developing research focus areas for the institute
- Leading the design of a unique cutting-edge facility and two testbeds
- Continuously meeting large and small companies to expand partnerships and membership
- Meet with funding agencies (federal and industry) to promote engineering and business faculty and research
- Establishing steering committee, industry advisory board, and academic advisory board for the institute

Associate Dean for Research, College of Engineering & Applied Science, UW-Milwaukee, Duties and Impact:

- Responsible for leading all college research initiatives
- Support development of new institutes and centers within College of Engineering & Applied Science (CEAS) and UW-Milwaukee (UWM)
- Leading the effort to establish a campus-wide Connected Systems Institute (CSI) at UWM (https://uwm.edu/csi/)
- Support the establishment of Institute on Physical Infrastructure and Transportation (IPIT)
- Support UWM's effort to join DOE REMADE Institute
- Work with stakeholders to establish public-private partnerships on research
- Meet with funding agencies (federal and industry) to promote CEAS faculty and research
- Support development of large funding proposals within CEAS
- Support UWM level research initiatives and partnerships
- Starting Milwaukee Engineering Research Conference (MERC) (https://uwm.edu/engineering/2019-milwaukee-engineering-research-conference/)
- Expanding and maintaining CEAS Poster Competition (https://uwm.edu/engineering/poster-competition/)

Educational Programs:

Supported the College of Engineering at UW-Milwaukee to establish Undergraduate Energy Certificate. Led the process for establishing Master of Engineering with Concentration on Energy. Supported new course initiatives in other departments to be included in the certificate programs.

Research Programs:

- Interim Executive Director for UWM Connected Systems Institute (CSI)
- Established UWM site for National Science Foundation (NSF) Grid-connected Advanced Power Electronics Systems (GRAPES) center with supports from seven companies.
- Established Center for Sustainable Electrical Energy Systems (SEES).
- Working on developing a smart and connected energy/water testbed for US Air Force
- Established two state-of-the-art research facilities with many work benches, equipment and supplies to conduct cutting edge research on energy storage, microgrids, and energy conversion.
- Established UWM Microgrid System with 12 kW wind, 100kW solar PV, two 45kW natural gas generators, 114kWh and 50kWh energy storage systems, active and passive loads, switchgear, monitoring, and controls.
- **Research Interests:** Power electronics; distributed generations; microgrids; energy efficiency; energy-water nexus, grid interface; energy storage systems; interface and controls; data intensive energy systems; smart and connected energy systems.
- **Educational Activities:** Taught courses in the areas of power electronics, power systems, electric drives, and renewable energy. Established four new courses: advanced power electronics; controls for renewable energy; renewable energy systems; and introduction to wind energy.
- **Graduate Students:** Supervised **sixteen Ph.D.** dissertations and **twenty M.S.** theses; currently supervising three postdoctoral fellows, two visiting professors, **seven Ph.D.** students and **two M.S.** students.
- **Research Associates** (Postdoctoral fellows) **and Visiting Professors**: Currently supervising **two**.
- **Editorial Activities:** Editor, IEEE Transactions on Smart Grid (2013-2019); Paper Review Chair, IEEE Transactions on Industry Applications (2017-2019); Editor, Journal of Electric Power Components and Systems; Associate Editor, International Journal of Power Electronics; General Chair, IEEE SLED 2012 Conference; General Chair, IEEE PEMWA Symposium, General Chair, ICRERA 2014 Conference, Vice Chair and Topic Chair, IEEE IECON and ECCE conferences.

Research Plans:

- Lead large-scale center-based programs for sustainable inter-disciplinary research
- Conduct research on data-intensive energy/water systems
- Expand research collaborations with military

- **Industrial Collaborations:** Have established research collaborations with several industrial partners including Eaton Corporation, Johnson Controls, Rockwell Automation, We Energies, Microsoft, ANSYS, A.O. Smith, Caterpillar, Regal Beloit, GE Healthcare, GE Global Research, Caterpillar Mining, DRS Technologies, ZBB Energy, Kohler, Wisconsin Energy Research Consortium, S&C Electric, G&W Electric, etc.

I. BIOGRAPHICAL DATA

A. Formal education.

Ph.D. in Electrical Engineering - 2004
Illinois Institute of Technology, Chicago, IL

M.S. in Electrical Engineering - 1998
Sharif University of Technology, Tehran, Iran

B.S. in Electrical Engineering - 1996
Sharif University of Technology, Tehran, Iran

A. Positions held.

Nov 2018 – Jan 2020: Interim Executive Director, Connected Systems Institute, University of Wisconsin-Milwaukee.

April 2015 – present: Co-founder and Chief Executive Officer, Imagen Energy, LLC.

Aug 2015 – Feb 2018: Associate Dean for Research, College of Engineering and Applied Science, University of Wisconsin-Milwaukee.

Aug 2013 - present: Professor, Department of Electrical Engineering and Computer Science, University of Wisconsin-Milwaukee.

Aug 2010 - Jul 2013: Associate Professor, Department of Electrical Engineering and Computer Science, University of Wisconsin-Milwaukee.

Jun 2011 - Jul 2012: Visiting Scientist, Innovation Center, Eaton Corporation, Milwaukee, WI.

Aug 2005 - Aug 2010: Assistant Professor, Department of Electrical Engineering and Computer Science, University of Wisconsin-Milwaukee.

Dec 2003 - Aug 2005: Senior Electrical Engineer, ForHealth Technologies, Inc., Daytona Beach, FL.

Sep 2001 - May 2004: Doctoral Research Assistant, Grainger Power Electronics and Motor Drives Laboratory, Illinois Institute of Technology, Chicago, IL.

May 1997 - Aug 2001: Senior Engineer, Moshanir Power Engineering Company, Tehran, Iran.

May 1996- Apr 1997: Engineer, Bakhtar Regional Electric Co., Arak, Iran.

Sep 1995 - Aug 1997: Graduate Research Assistant, Department of Electrical Engineering, Sharif University of Technology, Tehran, Iran.

B. Special honors and awards.

1. 2010 Milwaukee Young Engineer of the Year, Engineers and Scientists of Milwaukee.
2. Recipient: Graduate School/UWM Foundation Research Award, 2009-2010.
3. DOE Solar Prize, 2019
4. Wisconsin Center for Technology Commercialization Innovation Award, 2018

II. RESEARCH ACHIEVEMENT

A. Publications.

1. Books and monographs.

[1] "Internet of Things (IoT) for Data Intensive Industrial Asset Management: Algorithms and Implementation", Springer, 236 pages, by M. Balali, N. Nouri, A. Nasiri, and T. Zhao, ISBN: 978-3030359294, 2020.

[2] Text Book Title: "Uninterruptible Power Supplies and Active Filters" by A. Emadi, A. Nasiri, and S. B. Bekiarov. CRC Press, ISBN: 0-8493-3035-1, October 2004, Boca Raton, FL, 296 pages, chapters 2,3,5 and 6 (131 pages out of 273).

[3] "Uninterruptible Power Supplies" of "Academic Press Power Electronics Handbook", A. Nasiri, Chapter 24, pp. 619-635, Elsevier Publishing, ISBN 10: 0-12-088479-8, first edition 2006, second edition 2007, third edition 2011.

[4] Luke Weber and Adel Nasiri, Chapter 9: Uninterruptible Power Supplies. Book title: "Power Electronic Converters and Systems: Frontiers and applications" Author: Andrzej M. Trzynadlowski Year: 2015, ISBN: 978-1-84919-826-4.

[5] Bora Novakovic and Adel Nasiri, Chapter 1: Introduction to electrical energy systems. Book Title: Electric Renewable Energy Systems, 1st Edition, Muhammad Rashid, ISBN 9780128044483, Release Date: 02 Dec 2015, Imprint: Academic Press.

[6] Ahmad Hamidi and Adel Nasiri, Chapter 10: Energy Storage Systems. Book Title: Renewable Energy Devices and Systems with Simulations in MATLAB and ANSYS, Taylor and Francis, 2017.

2. Scholarly publications in refereed journals.

[1] N. Altin, S. Ozdemir, and A. Nasiri, "A Novel Topology for Solar PV Inverter Based on an LLC Resonant Converter with Optimal Frequency and Phase-Shift Control," submitted to IEEE Transactions on Power Electronics, TPEL-Reg-2020-10-2319.

[2] N. Altin, S. Ozdemir, A. El Shafei, and A. Nasiri, "Review of Standards on Insulation Coordination for Medium Voltage Power Converters," IEEE Open Journal of Power Electronics, March 2021, 10.1109/OJPEL.2021.3065813.

[3] S. H. H. Sadeghi, S. A. Hosseini, and A. Nasiri, "Decentralized Adaptive Protection Coordination based on Agents Social Activities for Microgrids with Topological and

Operational Uncertainties," IEEE Transactions on Industry Applications, vol. 57, no. 1, pp. 702-713, 2021.

[4] G. Jean-Pierre, A. El Shafei, N. Altin, Adel Nasiri, "A Multiport Bidirectional LLC Resonant Converter for Grid-Tied Photovoltaic-Battery Hybrid System," International Journal of Renewable Energy Research, vol. 10, no. 2, June 2020.

[5] M. Rashidi, N. Altin, S. Ozdemir, A. Bani-Ahmed, M. Sabbah, A. Nasiri, "Design and Implementation of a LLC Resonant Solid-State Transformer," IEEE Transactions on Industry Applications, vol. 56, no. 4, pp. 3855 – 3864, 2020.

[6] M. Rashidi, N. Altin, S. Ozdemir, S. Bani-Ahmed, and A. Nasiri, "Design and Development of a High Frequency Multi-Port Solid State Transformer with Decoupled Control Scheme," IEEE Transactions on Industry Applications, volume: 55, no. 6, pp. 7515 – 7526, Dec 2019.

[7] N. Nouri, M. Balali, and A. Nasiri, "Water Withdrawal and Consumption Reduction for Electrical Energy Generation Systems," Journal of Applied Energy, vol. 248, pp. 196-206, Aug 2019.

[8] M. Khayamy and A. Nasiri, "Development of an Equivalent Circuit for Batteries Based on a Distributed Impedance Network," IEEE Transactions on Vehicular Technology, vol. 69, no. 6, pp. 6119-6128, June 2020.

[9] N. Yahya Soltani and A. Nasiri, "Chance-constrained Optimization of Energy Storage Capacity for Microgrids," IEEE Transactions on Smart Grid, vol. 11, no. 4, pp. 2760-2770 July 2020.

[10] F. Balali, H. K. Seifoddini, A. Nasiri, "Data-Driven Predictive Model of Reliability Estimation Using Degradation Models – A Review," Springer Life Cycle Reliability and Safety Engineering, Feb 2020.

[11] M. Khayamy, A. Nasiri, and M. Balali, "Analytical Study Based Optimal Placement of Energy Storage Devices in Distribution Systems to Support Voltage and Angle Stability," International Journal of Smart Grid, vol.3, no.4, Dec 2019.

[12] Y. Wei, Q. Luo, X. Du, N. Altin, A. Nasiri, J. M. Alonso, "A Dual Half-bridge LLC Resonant Converter with Magnetic Control for Battery Charger Application," IEEE Transactions on Power Electronics, vol. 35, no. 2, pp. 2196 – 2207, Feb 2020.

[13] A. Bani-Ahmed, M. Rashidi, and A. Nasiri, "Decentralized Resilient Autonomous Control Architecture for Dynamic Microgrids," IET Generation, Transmission & Distribution, vol. 13, no. 11, p. 2182 –2189, 2019.

[14] A. Bani-Ahmed, M. Rashidi, A. Nasiri, and H. Hosseini, "Reliability Analysis of a Decentralized Microgrid Control Architecture," IEEE Transactions on Smart Grid, vol. 10, no. 4, pp. 3910 – 3918, 2019.

[15] S. Bani-Ahmed, A. Nasiri, I. Stamenkovic, "Foundational Support Systems of the Smart Grid: State of the Art and Future Trends," International Journal of Smart Grid, vol. 2 no. 1, March 2018.

[16] L. Weber, A. Nasiri, and H. Akbari, "Dynamic Modeling and Control of a Synchronous Generator in an AC Microgrid Environment," IEEE Transactions on Industry Applications, vol. 54, no. 5, pp. 4833 – 4841, 2018.

[17] E. Hossain, R. Perez, A. Nasiri, S. Padmanaban, "A Comprehensive Review on Constant Power Loads Compensation Techniques," IEEE Access, pp. 33285-33305, June 2018.

[18] E. Hossain, R. Perez, A. Nasiri, R. Bayindir, “Stability improvement of microgrids in the presence of constant power loads,” Elsevier Electrical Power and Energy Systems 96 (2018) 442–456.

[19] E. Hossain, R. Perez, A. Nasiri, R. Bayindir, “Development of Lyapunov redesign controller for microgrids with constant power loads,” Elsevier Renewable Energy Focus, vol. 19–20, pp. 49-62, June 2017.

[20] M. Balali, J. Nouri, M. Rashidi, A. Nasiri, and W. Otieno, “A Multi-Predictor Model to Estimate Solar and Wind Energy Generations,” International Journal of Energy Research, pp. 1-11, DOI: 10.1002/er.3853, Aug 2017.

[21] M. Balali, J. Nouri, E. Omrani, A. Nasiri, and W. Otieno, “An Overview of the Environmental, Economic, and Material Developments of the Solar and Wind Sources Coupled with the Energy Storage Systems,” International Journal of Energy Research, DOI: 10.1002/er.3755, May 2017.

[22] B. Novakovic and A. Nasiri, “Modular Multilevel Converter for Wind Energy Storage Applications," IEEE Transactions on Industrial Electronics, vol. 64, no. 11, pp. 8867-8876, 2017.

[23] S. A. Hosseini, H. A. Abyaneh, S. H. H. Sadeghi, F. Razavi, A. Nasiri, “An overview of microgrid protection methods and the factors involved,” Renewable and Sustainable Energy Reviews, vol. 64 (Oct 2016), pp. 174–186.

[24] R. Eslami, S. H. H. Sadeghi, H. Askarian-Abyaneh, and A. Nasiri, “A Novel Method for Fault Detection in Future Renewable Electric Energy Delivery and Management Microgrids, Considering Uncertainties in Network Topology,” Journal of Power Components and Systems, vol. 45, no. 10, pp. 1118-1129, 2017.

[25] A. Solanki, A. Nasiri, Q. Fu, V. Bhavaraju, T. Abdallah, and D. Yu, "A New Framework for Microgrid Management: Virtual Droop Control," IEEE Transactions on Smart Grid, vol. 7, no. 2, pp. 554-566, Mar. 2016.

[26] Invited: Q. Fu, A. Nasiri, A. Solanki, A. Bani-Ahmed, L. Weber, and V. Bhavarajua, "Microgrids, Energy Management, Controls, and Communications," Journal of Power Components and Systems, vol. 43, No. 12, pp. 1453-1465, July 2015.

[27] Q. Fu, A. Hamidi, A. Nasiri, V. Bhavaraju, B. Krstic, and P. Theisen, "The Role of Energy Storage in a Microgrid Concept," IEEE Electrification Magazine, vol. 1, no. 2, Dec 2013.

[28] Q. Fu, A. Solanki, A. Nasiri, V. Bhavaraju, T. Abdallah, and D. Yu, "Transition Management of Microgrids with High Penetration of Renewable Energy," IEEE Transactions on Smart Grid, vol. 5, no. 2, pp. 539 - 549, 2014.

[29] O. Abdel-Baqi, P. Miller, and A. Nasiri, "Dynamic Performance Improvement and Peak Power Limiting Using Ultracapacitor Storage System for Hydraulic Mining Shovels," IEEE Transactions on Industrial Electronics, vol. 62, no. 5, pp. 3173 – 3181, May 2015.

[30] O. Abdel-Baqi, P. Miller, and A. Nasiri, "Energy Management for an 8000HP Hybrid Hydraulic Mining Shovel," IEEE Transactions on Industry Applications, vol. 52, no. 6, Nov/Dec 2016.

[31] B. Novakovic, D. Ionel, M. Solveson, and A. Nasiri, "Comprehensive Modeling of Turbine Systems from Wind to Electric Grid," IEEE Industry Applications Magazine, vol. 22, no. 5, pp. 73 – 84, Sep/Oct 2016.

[32] E. Manla and A. Nasiri, "Development of an Electrical Model for Lithium-Ion Ultracapacitors," IEEE Journal of Emerging and Selected Topics in Power Electronics, Vol. 3, no. 2, pp. 395-404, 2015.

[33] Invited: S. A. Hamidi, D. Ionel, A. Nasiri, "Modeling and Management of Batteries and Ultracapacitors for Renewable Energy Support in Electric Power Systems–An Overview," Journal of Power Components and Systems," vol. 43, no. 12, pp. 1434-1452, July 2015.

[34] G. Mandic and A. Nasiri, "Lithium-Ion Capacitor Energy Storage Integrated With Variable Speed Wind Turbines for Power Smoothing," IEEE Journal of Emerging and Selected Topics in Power Electronics, vol. 1, no. 4, pp. 287 - 295, 2013.

[35] Yogesh Patel and A. Nasiri, "Multi-Level Wind Turbine Inverter to Provide Grid Ancillary Support," International Journal of Renewable Energy Research, vol. 4, no. 4, 2014.

[36] V. Bhavaraju, A. Nasiri, and Q. Fu, "Multi-Inverter Controls and Management of Energy Storage for Microgrid Islanding," The Electricity Journal, vol. 25, no. 8, pp. 36-44, 2012.

[37] Q. Fu, L. Montoya, A. Solanki, A. Nasiri, V. Bhavaraju, and D. Yu, "Microgrid Generation Capacity Design with Renewables and Energy Storage Addressing Power Quality and Surety," IEEE Transactions on Smart Grid, vol. 3, no. 4, pp. 2019-2027, 2012.

[38] G. Mandic, A. Nasiri, E. Muljadi, and F. Oyague, "Active Torque Control for Gearbox Load Reduction in a Variable Speed Wind Turbine," IEEE Transactions on Industrial Electronics, vol. 48, no. 6, pp. 2424-2432, 2012.

[39] A. Esmaili, A. Nasiri, and O. Abdel-Baqi, "A Hybrid System of Li-Ion Capacitors and Flow Battery for Dynamic Wind Energy Support," IEEE Transactions on Industry Applications, vol. 49, no. 4, pp. 1649-1657, 2013.

[40] O. Abdel-Baqi and A. Nasiri, "Series Voltage Compensation for DFIG Wind Turbine Low Voltage Ride-Through Solution," IEEE Transactions on Energy Conversion, vol. 26, no. 1, pp. 272 - 280, 2011.

[41] A. Nasiri, S. Zabalawi, and D. Jeutter, "A Linear Permanent Magnet Generator for Powering Implanted Electronic Devices," IEEE Transactions on Power Electronics, vol. 26, no. 1, pp. 192 - 199, 2011.

[42] E. Manla, A. Nasiri, C. Rentel, and Michael Hughes, "Modeling of Zinc-Bromide Energy Storage for Vehicular Applications", IEEE Transactions on Industrial Electronics, vol. 57, no. 2, pp. 624-632, 2010.

[43] O. Abdel-Baqi and A. Nasiri, "A Dynamic LVRT Solution for Doubly-Fed Induction Generators," IEEE Transactions on Power Electronics, vol. 25, no. 1, pp. 193-196, 2010.

[44] A. Nasiri, S. Zabalawi, and G. Mandic, "Indoor Power Harvesting Using Photovoltaic Cells for Low Power Applications," IEEE Transactions on Industrial Electronics, vol. 56, no. 11, pp. 4502-4509, 2009.

[45] Abedini and A. Nasiri, "Output power smoothing for wind turbine PM synchronous generators using rotor inertia," Journal of Power Components and Systems, vol. 37, no. 1, January 2009.

[46] Abedini, G. Mandic, and A. Nasiri, "Wind power smoothing using rotor inertia aimed at reducing grid susceptibility," Int. J. of Power Electronics, vol. 1, no. 2, pp. 227 – 247, 2008.

[47] A. Nasiri, "Wind Power Smoothing," WindTech International Magazine, vol. 5, no. 1, pp. 37-39, 2009.

[48] Abedini, S. Zabalawi, and A. Nasiri, "A three-phase uninterruptible power supply with an adaptive reference waveform generator," Int. J. of Power Electronics, vol. 1, no.1, pp. 63 – 86, 2008.

[49] A. Nasiri, Z. Nie, S. Bekiarov, A. Emadi, "An On-Line UPS System with Power Factor Correction and Electric Isolation Using BIFRED Converter," IEEE Transactions on Industrial Electronics, vol. 55, no. 2, pp. 722-730, 2007.

[50] A. Nasiri, "Digital Control of Three-Phase Series-Parallel Uninterruptible Power Supply Systems," IEEE Transactions on Power Electronics, vol. 22, no. 4, pp. 1116 - 1127, July 2007.

[51] A. Nasiri, "Full Digital Current Control of Permanent Magnet Synchronous Motors for Vehicular Applications," IEEE Transactions on Vehicular Technology, vol. 56, no. 4, Part 1, pp. 1531 - 1537, July 2007.

[52] M. Radmehr, S. Farhanghi, and A. Nasiri, "Effects of Power Quality Distortions on Electrical Drives and Transformer Life in Paper Industries: Simulations and Real Time Measurements," IEEE Industry Application Magazine, vol. 13, no. 5, pp. 38-48, Sep/Oct 2007.

[53] S. R. Rimmalapudi, S. Williamson, A. Nasiri and A. Emadi, "Validation of Generalized State Space Averaging Method for Modeling and Simulation of Power Electronic Converters for Renewable Energy Systems," Journal of Electrical Engineering & Technology, vol. 2, no. 2, pp. 231-240, 2007.

[54] Mohammad S. Naderi, M. Vakilian, T. R. Blackburn, B. T. Phung, and A. Nasiri, "A Hybrid Transformer Model for Determination of Partial Discharge Location in Transformer Winding," IEEE Transactions on Dielectrics and Electrical Insulation, vol. 14, no. 2, Pages: 436-443, April 2007.

[55] Mohammad S. Naderi, T. R. Blackburn, B. T. Phung, and A. Nasiri, "Determination of Partial Discharge Propagation and Location in Transformer Windings Using a Hybrid Transformer Model," Journal of Electric Power Components and System, vol. 35, no. 6, Pages: 607-623, ISSN: 1532-5008, June 2007.

[56] Mohammad S. Naderi, T. R. Blackburn, B. T. Phung, and A. Nasiri, "Application of Wavelet Analysis to the Determination of Partial Discharge Location in Multiple-α Transformer Windings," Journal of Electric Power System Research, vol. 78 (2), pp. 202-208, 2007.

[57] A. Nasiri, A. Argun, and A. Emadi, "Series-parallel active filter/UPS system," Journal of Electric Power Components and Systems, vol. 32, no. 11, Nov. 2004.

3. Refereed conference proceedings.

[1] G. Jean-Pierre, H. Akbarihaghighat, T. Zhao, A. Berger, N. Nafsin, F. Bin Nasir, H. Bravo1, J. Li, A. Nasiri, and M. Nowak, "Development of a Data Analytics Platform for an Electrical/Water Microgrid," 2021 IEEE 12th International Symposium on Power Electronics for Distributed Generation Systems (PEDG), Chicago, IL.

[2] S. Beheshtaein, A. El Shafei, G. Jean-Pierre, N. Altin; M. Khayamy, R. Cuzner, A. Nasiri, "An Optimal Design of a Hybrid Liquid/Air Cooling System for High Power, Medium Frequency, and Medium Voltage Solid-State Transformer," 2021 IEEE 12th International Symposium on Power Electronics for Distributed Generation Systems (PEDG), Chicago, IL.

[3] G. Jean-Pierre, S. Beheshtaein, N. Altin, A. Nasiri, “A Control Scheme for a DC Extreme Fast Charger with RMS Current Minimization,” 2021 IEEE 12th International Symposium on Power Electronics for Distributed Generation Systems (PEDG), Chicago, IL.

[4] G. Jean-Pierre, S. Beheshtaein, N. Altin, A. Nasiri, “Control and Loss Analysis of a Solid State Transformer Based DC Extreme Fast Charger,” 2021 IEEE Transportation Electrification Conference & Expo (ITEC), Chicago, IL.

[5] Z. Jankovic, P. Murthy, L. Wei, and A. Nasiri, "Dynamic Discontinuous PWM for Grid-Tied Inverter Applications," in Proc. Energy Conversion Congress & Expo (ECCE) Oct 2020, Detroit, MI.

[6] G. Jean-Pierre, M. Khayamy, N. Altin, A. El Shafei, A. Nasiri, "A Triple Phase-Shift Based Control Method for RMS Current Minimization and Power Sharing Control for Input-Series Output-Parallel Dual Active Bridge Converter”, in Proc. International Transportation Electrification Conference (ITEC), June 2020, Chicago, IL.

[7] G. Jean-Pierre, N. Altin, A. El Shafei, A. Nasiri, "Efficiency Optimization of Dual Active Bridge DC-DC Converter with Triple Phase-Shift Control", in Proc. Energy Conversion Congress & Expo (ECCE) Oct 2020, Detroit, MI.

[8] A. El Shafei, S. Ozdemir, N. Altin, G. Jean-Pierre, and A. Nasiri, “Design and Implementation of a Medium Voltage, High Power, High Frequency Four-Port Transformer,” in Proc. IEEE Applied Power Electronics Conference and Exposition (APEC), Mar 2020, New Orleans, LA.

[9] G. Jean-Pierre, N. Altin, A. El Shafei, A. Nasiri, “A Control Scheme Based on Lyapunov Function for Cascaded H-Bridge Multilevel Active Rectifiers,” to be presented at the IEEE Applied Power Electronics Conference and Exposition (APEC), Mar 2020, New Orleans, LA.

[10] A. El Shafei, S. Ozdemir, N. Altin, G. Jean-Pierre, and Adel Nasiri, “A High Power High Frequency Transformer Design for Solid State Transformer Applications,” in Proceeding International Conference on Renewable Energy Research and Applications (ICRERA), Oct 2019, Brasov, Romania.

[11] G. Jean-Pierre, A. El Shafei, N. Altin, and A. Nasiri, “A Multiport Bidirectional LLC Resonant Converter for Grid-Tied Photovoltaic-Battery Hybrid System,” in Proceeding International Conference on Renewable Energy Research and Applications (ICRERA), Oct 2019, Brasov, Romania.

[12] A. El Shafei, S. Ozdemir, N. Altin, G. Jean-Pierre, and Adel Nasiri, “A Complete Design of a High Frequency Medium Voltage Multi-Port Transformer,” in Proceeding International Conference on Renewable Energy Research and Applications (ICRERA), Oct 2019, Brasov, Romania.

[13] N. Altin, S. Ozdemir, and A. Nasiri, “A Novel Solar PV Inverter Topology Based on an LLC Resonant Converter,” in Proc. the IEEE Energy Conversion Conference and Expo (ECCE), Baltimore, MD, Sep. 2019.

[14] N. Altin, S. Ozdemir, A. El-Shafei, and A. Nasiri, “A Decoupled Control Scheme of Four-Port Solid State Transformer,” in Proc. the IEEE Energy Conversion Conference and Expo (ECCE), Baltimore, MD, Sep. 2019.

[15] F. Balali, H. K. Seifoddini, A. Nasiri, “Essentials to Develop Data-Driven Predictive Models of Prognostics and Health Management for Distributed Electrical Systems,” IEEE

International Conference on Prognostics and Health Management (ICPHM), 17-20 June 2019, San Francisco, CA.

[16] A. Rajendra, J. Zhang, and Adel Nasiri, "Optimal Variable Load Scheduling for Hybrid Energy Systems," in Proc. the IEEE Energy Conversion Conference and Expo (ECCE), Baltimore, MD, Sep. 2019.

[17] H. Akbari Haghighat and A. Nasiri, "Mitigating Communication Delay Impact on Microgrid Stability Using a Compensator Based on Smith Predictor," in Proc. the IEEE Energy Conversion Conference and Expo (ECCE), Baltimore, MD, Sep. 2019.

[18] S. A. Hosseini, S. H. H. Sadeghi, and A. Nasiri "A Decentralized Adaptive Scheme for Protection Coordination of Microgrids Based on Team Working of Agents," in Proceeding International Conference on Renewable Energy Research and Applications (ICRERA), Oct 2018, Paris, France.

[19] Y. Wei, N. Altin, and A. Nasiri, "A High Efficiency, Decoupled On-board Battery Charger with Magnetic Control," in Proceeding International Conference on Renewable Energy Research and Applications (ICRERA), Oct 2018, Paris, France.

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[21] R. Nasiri, M. Khayamy, M. Rashidi and A. Nasiri "Optimal Solar PV Sizing for Inverters Based on the Specific Local Climate," in Proceeding IEEE Energy Conversion Conference and Expo (ECCE), Sep. 2018.

[22] A. Bani-Ahmed, M. Rashidi, and A. Nasiri, "Coordinated Failure Response and Recovery in a Decentralized Microgrid Architecture," in Proc. IEEE Energy Conversion Conference and Expo (ECCE), Cincinnati, OH, Sep. 2017.

[23] M. Rashidi, A. Bani-Ahmed, A. Nasiri, and M. Balali, "Design and Implementation of a Series Resonant Solid State Transformer," in Proc. IEEE Energy Conversion Conference and Expo (ECCE), Cincinnati, OH, Sep. 2017.

[24] S. Cunningham and A. Nasiri, "Control and Implementation of Back to Back Converters Utilizing IEEE 519-2014," in Proc. 2017 International Conference on Renewable Energy Research and Applications (ICRERA), San Diego, CA.

[25] M. Rashidi and A. Nasiri, "Design and Implementation of a Multi Winding High Frequency Transformer for MPSST Application," in Proc. 2017 International Conference on Renewable Energy Research and Applications (ICRERA), San Diego, CA.

[26] M. Rashidi, A. Bani-Ahmed, and A. Nasiri, "Application of a Multi-Port Solid State Transformer for Volt-VAR Control in Distribution Systems," in Proc. IEEE Power and Energy Conference, PES General Meeting, July. 2017.

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[28] A. Bani-Ahmed, A. Nasiri, and H. Hosseini, "Design and Development of a True Decentralized Control Architecture for Microgrid," in Proc. IEEE Energy Conversion Conference and Expo (ECCE), Sep. 2016.

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[49] A. Solanki, A. Nasiri, V. Bhavaraju, "Microgrid Power Management Using Virtual Droop Control Method," in Proc. International Conference on Renewable Energy Research and Applications (ICRERA), Oct. 2013, Madrid, Spain.

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[51] Y. Patel and A. Nasiri, "Medium Voltage Inverter to Establish Grid Interface and Provide Ancillary Support for DC Distributed Wind Farms," in Proc. IEEE Energy Conversion Conference and Expo (ECCE), Sep. 2013, Denver, CO.

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[64] Ali Esmaili and Adel Nasiri, "Power Smoothing and Power Ramp Control for Wind Energy Using Energy Storage," in Proc. IEEE Energy Conversion Conference and Expo (ECCE), 2011, Phoenix, AZ.

[65] Emad Manla, Goran Mandic and Adel Nasiri, "Testing and Modeling of Lithium-Ion Ultracapacitors," in Proc. IEEE Energy Conversion Conference and Expo (ECCE), 2011, Phoenix, AZ.

[66] Goran Mandic, Adel Nasiri and Eduard Muljadi, "Mechanical Stress Reduction in Variable Speed Wind Turbine Drivetrains," in Proc. IEEE Energy Conversion Conference and Expo (ECCE), 2011, Phoenix, AZ.

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[71] G. Mandic and A. Nasiri "Modeling and Simulation of a Wind Turbine System with Ultracapacitors for Short-Term Power Smoothing," in Proc. IEEE International Symposium on Industrial Electronics, July 2010, Bari, Italy.

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[73] A. Esmaili and A. Nasiri, "A Case Study on Improving ELCC by Utilization of Energy Storage with Solar PV," in Proc. 35th IEEE Industrial Electronics Conference, Nov 2009, Porto, Portugal.

[74] A. Nasiri, "Grid Integration Issues for New Wind Turbine Generators," WI Renewable Energy Summit, March 25 - 28, 2009, Milwaukee, WI.

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[85] R. Nanayakkara and A. Nasiri, "A Piezoelectric Transformer Based Inverter Topology for Immerging CCFL Inverter," in Proc. 23rd IEEE Applied Power Electronics Conference (APEC), Austin, TX, Feb 2008.

[86] D. Ahmadi and A. Nasiri, “A Fast Switching Method for PM Synchronous Motor Speed Control,” in Proc. 23rd IEEE Applied Power Electronics Conference (APEC), Austin, TX, Feb 2008.

[87] D. Ahmadi and A. Nasiri, "A Novel Digital Control Method of PMSM for Automotive Applications," in Proc. IEEE Vehicle Power and Propulsion (VPP) Conference, Sep. 2007, Arlington, TX.

[88] Y. H. Lee and A. Nasiri, "Conductive CM and DM Noise Analysis of Power Electronic Converters in Electric and Hybrid Electric Vehicles," in Proc. IEEE Vehicle Power and Propulsion (VPP) Conference, Sep. 2007, Arlington, TX.

[89] S. Zabalawi and A. Nasiri, "State Space Modeling and Simulation of Sensorless Control of BLDC Motors Using Instantaneous Rotor Position Tracking," in Proc. IEEE Vehicle Power and Propulsion (VPP) Conference, Sep. 2007, Arlington, TX.

[90] Z. Vrankovic and A. Nasiri, "A Novel Pulse Battery Charger Topology for Automotive Applications," in Proc. 38th IEEE Power Electronics Specialist Conference (PESC), Orlando, FL, June 2007.

[91] A. Nasiri, "A Novel Direct Torque Control Method of PM Synchronous Motors," in Proc. 38th IEEE Power Electronics Specialist Conference (PESC), Orlando, FL, June 2007.

[92] A. Abedini and A. Nasiri, “An Improved Adaptive Filter for Voltage and Current Reference Extraction,” presented in the International Power Electronics and Motion Control Conference (IPEMC 2006), vol. 1, pp. 1-5, Shanghai, China, August 2006.

[93] A. Abedini and A. Nasiri, “Modeling and Analysis of Hybrid Fuel Cell Systems for Vehicular Applications,” in Proc. IEEE Vehicle Power and Propulsion (VPP) Conference, Sep. 2006, Windsor, England, UK.

[94] Z. Vrankovic and A. Nasiri, “A Novel Battery Charger for Automotive Applications,” in Proc. IEEE Vehicle Power and Propulsion (VPP) Conference, Sep. 2006, Windsor, England, UK.

[95] M. Radmehr, S. Farhangi, and A. Nasiri, “Effects of Power Quality Distortions on Electrical Drives and Transformer Life in Paper Industries: Simulations and Real Time Measurements,” in Proc. 52nd Annual Pulp & Paper Industry Technical Conference, pp. 1-9, July 2006, Appleton, Wisconsin.

[96] A. Nasiri, “Different topologies of active EMI/ripple filters for automotive DC/DC converters,” in Proc. the IEEE Vehicle Power and Propulsion (VPP) Conference, Chicago, Illinois, Sep. 2005.

[97] A. Nasiri, “Harmonics in sea and undersea vehicles: sources, effects, and solutions,” in Proc. the IEEE Vehicle Power and Propulsion (VPP) Conference, Chicago, Illinois, Sep. 2005.

[98] A. Nasiri, V. S. Rimmalapudi, and A. Emadi, “Active control of a hybrid fuel cell-battery system,” in Proc. the International Power Electronics and Motion Control Conference, Xi'an, China, Aug. 2004.

[99] A. Nasiri and A. Emadi, “Digital control of three-phase series-parallel uninterruptible power supply/active filter system,” in Proc. 35th IEEE Power Electronics Specialist Conference, vol. 6, pp. 4115- 4120, Aachen, Germany, June 2004.

[100] A. Nasiri and A. Emadi, “Full digital control of a single-phase series-parallel uninterruptible power supply,” in Proc. 19th IEEE Applied Power Electronics Conference and Exposition, vol. 1, pp. 443- 449, Anaheim, California, Feb. 2004.

[101] A. Nasiri and A. Emadi, "Modeling, simulation, and analysis of active filter systems using generalized state space averaging method," in Proc. 29th IEEE Industrial Electronics Conference, vol. 3, pp. 1999- 2004, Roanoke, VA, Nov. 2003.

[102] B. Bekiarov, A. Nasiri, and A. Emadi, "A new reduced parts on-line single-phase UPS system," in Proc. 29th IEEE Industrial Electronics conference, vol. 1, pp. 688- 693, Roanoke, VA, Nov. 2003.

[103] A. Nasiri, S. B. Bekiarov, and A. Emadi, "Reduced parts single-phase series-parallel UPS Systems with active filter capabilities," in Proc. 25th IEEE International Telecommunications Energy Conference, vol. 1, pp. 366- 372, Yokohama, Japan, Oct. 2003.

[104] A. Nasiri, S. B. Bekiarov, and A. Emadi, "Reduced parts three-phase series-parallel UPS system with active filter capabilities," in Proc. 38th IEEE Industry Application Society Annual Meeting, vol. 2, pp. 963- 969, Salt Lake City, UT, Oct. 2003.

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[106] A. Argun, A. Nasiri, and A. Emadi, "A comparative study of single-phase active filters for improving power quality," in Proc. IEEE Electro/Information Technology Conference, Indianapolis, IN, June 2003.

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[108] S. Onoda, S. M. Lukic, A. Nasiri, and A. Emadi, "A PSIM-based modeling tool for conventional, electric, and hybrid electric vehicles studies," in Proc. 56th IEEE Vehicular Technology Conference, vol. 3, pp. 1676-1680, Vancouver, BC, Canada, Sep. 2002.

4. Patents.

[1] A. Nasiri and S. A. Hamidi, "Uninterruptible Power Supply (UPS) Direct Current (DC) Load Leveling," Application US20170085122A1, 2016.

[2] A. Nasiri and S. A. Hamidi, "Battery Management System," Patent no. US10003214B2, June 19, 2018.

[3] O. Abdel-Baqi, A. Nasiri, P. Miller, J. Helfrich, "Energy System for Heavy Equipment", Patent no. 8606451, Dec 10, 2013.

[4] A. Nasiri, "Wind energy power conversion system reducing gearbox stress and improving power stability" Patent No. US20110089693 A1, June 18, 2014 (Licensed by Dynamic Blades Technologies Inc.).

[5] A. Nasiri and W. Khan, "Automated use of a vision system to detect foreign matter in reconstituted drugs before transfer to a syringe," Patent no. 7,163,035, Jan 2007.

[6] A. Nasiri and W. Khan, "Medication dose underfill detection system and application in an automated syringe preparing system," Patent no. 7,343,943, Sep 2004.

[7] A. Nasiri, W. Khan, and D. Tribble "Reconstituting a drug vial and medication dose underfill detection system in an automated syringe preparing system," International Patent no. WO/2005/096776, Oct 2005.

5. Select invited lectures presented at universities, industry, etc.

[1] "High Power and Medium Voltage Dual Active Bridges" Keynote speech, 8th International Conference on Smart Grid, June, 2020, Paris, France.

[2] "Connected Systems Institute Initiative," NEW Manufacturing Alliance's Full Membership Meeting, June 14, 2018.

[3] DOE Workshop, "Enabling Advanced Power Electronics Technologies," Sandia National Lab, Albuquerque, NM, July 17.

[4] "Energy Storage Technologies: Advances in Research," Energy Storage Global Innovation Forum, June 2018, Milwaukee, WI.

[5] "Connected Energy and Water Systems" Wisconsin Technical Council, December 2018.

[6] "Energy Storage Systems for Grid Applications" Australian National University, Jan 2017, Canberra, Australia.

[7] "DC UPS and Load Leveling for Pulse Loads" Keynote speech, 2016 International Conference on Renewable Energy Research and Applications (ICRERA), Birmingham, UK.

[8] "Design and Development on an Electric Mining Shovel" Keynote speech, 6th IEEE Transportation Electrification Conference and Expo, June 22-24, 2017.

[9] "Design, Implementation, and Energy Management of an 8000HP Hybrid Hydraulic Mining Shovel" Keynote speech, 2014 16th International Power Electronics and Motion Control Conference (PEMC), Antalya, Turkey.

[10] Research presentations at many universities including Chongqing University, North China Electric Power University, University of Illinois at Chicago, Tehran Polytechnic, Babol University, etc.

[11] "Stationary Energy Storage Systems" Milwaukee Engineering Research Conference, May 2015, Milwaukee, WI.

[12] "Microgrids" presented at Mid-American Regulatory Conference – Annual Meeting in Milwaukee, WI, 2015.

[13] "Smart Gird Development Workshop" Jan 23, 2015, Istanbul, Turkey.

[14] "Microgrid Systems" Wisconsin Distributed Resources Collaborative, Oct 10, 2014, Madison, WI.

[15] "Energy Storage for Wind and Solar PV," Renewable Energy Panel at 34th Industrial Electronics Conference, 2008, Orlando, FL.

[16] "UWM Microgrid System," presented at several Wisconsin Energy Research Consortium member meetings.

[17] "Energy Storage for Wind Energy Support," presented at the University of Illinois- Urbana Champaign, March 2010.

[18] "Power Electronics for Grid Interface," presented at Rockwell Automation seminar, May 2009.

[19] "Ongoing Research Activities on Power Electronics and Motor Drives at UWM" presented to local industries including Eaton Corporation, American Superconductors, Rockwell Automation, Abengoa, Johnson Controls, Harley Davidson, and Bucyrus International.

[20] "Microgrids for Renewable Energy Integration, Grid Support, and Energy Security Improvement," Illinois Institute of Technology, Feb 2014.

B. Grants, contracts and research awards.

1. External Funds.

[1] "Modular Expeditionary Technology Evaluation Resource (METER)" to establish a smart energy/water microgrid, January 2018-December 2021, Sponsor: **US Air Force** in 1collaborations with Eaton Corporation**,** $1,300,000, **A. Nasiri, Principal Investigator.**

[2] "GRid-connected Advanced Power Electronics Systems (GRAPES) Center site at UW-Milwaukee" Sponsored by **National Science Foundation** (NSF), $299,379, **A. Nasiri, Principal Investigator**, with Drs. D. Yu, R. Cuzner, and L. Wang (Co-PIs).

[3] "Non-Academic Research Internships for Graduate Students (INTERN) Supplemental Funding Opportunity" Sponsored by **National Science Foundation** (NSF), $74K, 2019, **A. Nasiri, Principal Investigator**.

[4] "Basic Expeditionary Airfield Resources (BEAR) Technology Evaluation and Integration Laboratory (BTEIL)" to establish a smart energy/water microgrid, January 2017-April 2019, Sponsor: **US Air Force** in collaborations with Eaton Corporation**,** $600,000, **A. Nasiri, Principal Investigator.**

[5] "Non-Academic Research Internships for Graduate Students (INTERN) Supplemental Funding Opportunity" Sponsored by **National Science Foundation** (NSF), $60K, 2018, **A. Nasiri, Principal Investigator**.

[6] "Veterans Research Supplement (VRS) Program" Sponsored by **National Science Foundation** (NSF), $20K, **A. Nasiri, Principal Investigator**.

[7] "Highly Efficient and Compact Medium Voltage Solar PV Inverter" sponsored by GRAPES NSF I/UCRC, $115K; Jan 2019-Dec 2020, **A. Nasiri, Principal Investigator**.

[8] "SBIR Phase I: Extremely Compact, High Efficiency, Integrated Converter and Energy Storage System" Sponsored by **National Science Foundation** (NSF), $224,906, 2016, Award#1648083, **A. Nasiri, Co-Principal Investigator.**

[9] "SBIR Phase II: Extremely Compact, High Efficiency, Integrated Converter and Energy Storage System" Sponsored by **National Science Foundation** (NSF), $626,856, 2018, Award#1831221, **A. Nasiri, Co-Principal Investigator.**

[10] "SBIR Phase I and II: 1200 V SiC Based Extremely Compact, 500 kW, 2000 Hz Inverter for High Speed Permanent Magnet Synchronous Machine (PMSM) Applications" Sponsored by **ARPA-E**, $847,887, 2018, Award# DE-AR0000909.

[11] "High Power Medium Frequency and Medium Voltage Dual Active Bridge as a Building Block" sponsored by GRAPES NSF I/UCRC, $116K; Jan 2020-Dec 2020, **A. Nasiri, Principal Investigator**.

[12] "Medium Voltage Multi-Port Solid State Transformer Design and Implementation for Microgrids and Distribution Systems" sponsored by GRAPES NSF I/UCRC, $43K; Jan 2019-Dec 2019, **A. Nasiri, Principal Investigator**.

[13] "Integrating Solar PV and Storage in a Compact Electrically Isolated SiC Based Multi-Port System" sponsored by DOE Solar Prize, $150K; Jan 2019-Dec 2019, **A. Nasiri, Principal Investigator**.

[14] "A Distributed Autonomous Control Concept and Architecture for Microgrids" sponsored by GRAPES NSF I/UCRC, $122,260; Jan 2017-Dec 2018, **A. Nasiri, Principal Investigator**.

[15] "Multi-Port Bi-Directional Resonant Solid State Transformer" sponsored by GRAPES NSF I/UCRC, $99,859, June 2016-Dec 2018, **A. Nasiri, Principal Investigator**.

[16] "Testing and Characterization of the Cost Effective Uninterruptible Power Supply (UPS) with Load Leveling for CT Systems" GE Catalyst Grant, $74,670; July 2016- June 2017, **A. Nasiri, Principal Investigator**.

[17] "Synchronous Generator Modeling under Unbalanced Conditions," Regal Beloit Company, $49,617K; Aug 2014- July 2015, **A. Nasiri, Principal Investigator**.

[18] "Cost Effective Uninterruptible Power Supply (UPS) with Load Leveling for CT Systems-Second Year III," GE Catalyst Grant, $75K; July 2015- June 2016, **A. Nasiri, Principal Investigator**.

[19] "Cost Effective Uninterruptible Power Supply (UPS) with Load Leveling for CT Systems-Second Year II," GE Catalyst Grant, $74,944; July 2014- June 2015, **A. Nasiri, Principal Investigator**.

[20] "Development of Next Generation Efficient Integrated Power System for Higher Power and Improved Survivability," Midwest Energy Research Consortium (M-WERC), $75K; 2014-2015, **A. Nasiri, Principal Investigator.**

[21] "Cost Effective Uninterruptible Power Supply (UPS) with Load Leveling for CT Systems," GE Catalyst Grant, $75K; 2013-2014, **A. Nasiri, Principal Investigator**.

[22] "Development of Improved Status Estimation Algorithms for Batteries and Ultracapacitors-Year II," 2012-2013, Sponsored by **Johnson Controls**, $150K, **A. Nasiri, Co-Principal Investigator,** Dr. Tom Jahns (UW-Madison), PI.

[23] "Hybrid Energy Module Development for High Efficiency Buildings," Sponsored by **Wisconsin Energy Research Consortium**, $75K; 2014-2015, **A. Nasiri, Co-Investigator,** Share: 40%, with Dr. Thomas Jahns, UW-Madison (Principal Investigator).

[24] "Developing a Model of a Net Zero Energy Campus in a DERS Environment," Sponsored by **Wisconsin Energy Research Consortium**, $75K; 2013-2014, **A. Nasiri, Co-Investigator,** Share: 20%, with Dr. Bass Abushakra, MSOE (Principal Investigator).

[25] "Energy Storage, Demand Response, and Renewable Energy Interaction at Building, Campus, and District Level," Sponsored by **Wisconsin Energy Research Consortium**, $75K; 2013-2014, **A. Nasiri, Co-Investigator,** Share: 20%, with Dr. Dan Ionel, UWM (Principal Investigator).

[26] "Planning and Design of Advanced Microgrid Testbed Facility in Milwaukee, Year II," Sponsored by **Wisconsin Energy Research Consortium**, $100K; 2013-2014, **A. Nasiri, Co-Investigator,** Share: 50%, with Dr. Thomas Jahns, UW-Madison (Principal Investigator).

[27] "Power System Modeling and Controls for an Integrated Alternative Power System: A Micro Grid Concept," Jun 2011-June 2013, Sponsor: **US Army Corps of Engineers through Eaton Corporation,** $319,027, **A. Nasiri** and D. Yu**, Principal Investigators**.

[28] "DC Power Distribution in Data Center," Eaton Corporation, $30K; 2013, **A. Nasiri, Principal Investigator**.

[29] "Optimization of Synchronous Reluctance Motors," 2013- 2014, Sponsor: **Regal Beloit Company,** $64,163, **A. Nasiri, Co-Investigator**, Share: 50%, with Dr. Dan Ionel as Principal Investigator.

[30] "GOALI: Characterization of Energy Storage System for Wind Energy Support" 2009-2012, Sponsored by **National Science Foundation** (NSF), $304,315, **A. Nasiri, Principal Investigator**, with Drs. D. Yu and V. Bhavaraju (Eaton Corp.), Co-PIs.

[31] "Lithium-Ion Ultracapacitors integrated with Wind Turbines Power Conversion Systems to Extend Operating Life and Improve Output Power Quality" 2009-2011, Sponsored by **Department of Energy**, $422,266; **A. Nasiri, Principal Investigator.**

[32] "REU Supplement, GOALI: Characterization of Energy Storage System for Wind Energy Support", Sponsored by NSF, $12K, 2012-2013, **A. Nasiri, Principal Investigator**.

[33] "Design Optimization of Electrical Machines –Coupled Thermal and Electromagnetic Analysis," Sponsored by Regal Beloit Company, $41,531; 2012-2013, **A. Nasiri, Principal Investigator.**

[34] "Planning and Design of Advanced Microgrid Testbed Facilities in Milwaukee and Madison," Sponsored by **Wisconsin Energy Research Consortium**, $100K; 2012-2013, **A. Nasiri, Co-Investigator**, Share: 50%, with Dr. Thomas Jahns, UW-Madison (Principal Investigator).

[35] "Integration of Second-Life Batteries into an EV Charging Station with Renewable Energy Sources," 2011-2012, Sponsored by **Wisconsin Energy Research Consortium**, $99,714, **A. Nasiri, Principal Investigator** with Dr. Tom Jahns (UW-Madison), Co-PI.

[36] "Development of Improved Status Estimation Algorithms for Batteries and Ultracapacitors," 2012-2013, Sponsored by **Johnson Controls**, $100K, **A. Nasiri, Co-Principal Investigator,** Dr. Tom Jahns (UW-Madison), PI.

[37] "Modeling of the Drivetrain for a Full Conversion Wind Turbine," 2011-2012, Sponsored by **Vestas**, $62,154, **A. Nasiri, Principal Investigator**.

[38] "Southeast Wisconsin Wind Energy Educational Collaborative" 2009-2011, Sponsored by **Department of Energy**, $330,184; **A. Nasiri, Co-Investigator**, Share: 12%, with Drs. D. Yu (Principal Investigator), Y. Li, M. Pickering, R. Amano (Co-PIs).

[39] "Controls for an Integrated System of Wind Energy and Energy Storage for Grid Frequency Support," 2010-2011, Sponsored by **We Energies**, $50K, **A. Nasiri, Primary Investigator**.

[40] "A Nationwide Consortium of Universities to Revitalize Electric Power Engineering Education by State-of-the-Art Laboratories," 2010-2013, Sponsored by **Department of Energy**, Ned Mohan, Primary Investigator (University of Minnesota), UWM Share $25K, **A. Nasiri, Co-Principal Investigator**.

[41] "Grid Frequency Support and Inertia Emulation Using Distributed Energy Storage Systems for Wind Turbines," 2010-2011, Sponsored by **UWM Research Foundation Catalyst Grant**, $50K, **A. Nasiri, Primary Investigator**.

[42] "DC Distribution for Wind Farms to Achieve Higher Efficiency and Reliability and Lower Cost" 2010-2011, Sponsored by **Wisconsin Energy Research Consortium**, $90K, **A. Nasiri, Principal Investigator**.

[43] "New energy storage technologies and power converter topologies for wind turbines" 2009-2010, Sponsored by Southeastern Wisconsin Renewable Energy Center, $85K, **A. Nasiri, Principal Investigator** (with Drs. N. Damerdash and C. Damm, Co-PIs).

[44] "Short-term wind energy support for wind energy" 2009-2010, Sponsored by **We Energies**, $133K, **A. Nasiri, Primary Investigator.**

[45] "Research on Solar Energy, We Energies" Sponsored by We Energies, $13,772, **A. Nasiri, Primary Investigator**.

[46] "Utilizing Energy Storage with PV for Residential and Commercial Customers" 2008-2010, Sponsored by **We Energies**, $171,268, **A. Nasiri, Primary Investigator**.

[47] "PV System Installation on EMS Building" 2008-2009, Sponsored by **Wisconsin Focus on Energy**, $35K, **A. Nasiri, Primary Investigator**.

[48] "PV System Implementation on EMS" 2008-2009, Sponsored by **We Energies**, $50,970, **A. Nasiri, Primary Investigator**.

[49] "Discretionary Support of Wind Energy Research at the University of Wisconsin-Milwaukee" 2008-2009, Sponsored by **We Energies**, $120K, **A. Nasiri, Co-Investigator**, with Drs. D. Yu (Principal Investigator) and Y. Li (Co-Investigator), Share: 33%.

[50] "Unrestricted research on renewable and energy storage" 2008-2009, Sponsored by **Eaton Corporation**, $25K, **A. Nasiri, Primary Investigator**.

[51] "UWM Carbon Neutral House" 2007-2009, Sponsored by **Department of Energy**, $100K, **A. Nasiri, Co-Investigator**, Share: 10%, with Drs. G. Thomson (Principal Investigator), Y. Li, and C. Conolis (Co-PIs).

[52] "Multidisciplinary wind energy research at University of Wisconsin-Milwaukee" 2008-2009, Sponsored by **We Energies**, $75K, **A. Nasiri, Co-Investigator**, with Drs. D. Yu (Principal Investigator) and Y. Li (Co-Investigator), Share: 33%.

[53] "Unrestricted research on conductive concrete for electrical grounding" 2007, Sponsored by **We Energies**, $5900, **A. Nasiri, Primary Investigator**.

[54] "Techniques for Efficient Integrated Transcutaneous Power/Signal Transmission for Left Ventricular Assist Devices" 2006-2007, Sponsored by University of Wisconsin System: **Applied Research Grant**, $50K, **A. Nasiri, Primary Investigator**.

2. Internal funds.

[1] "Planning Connected Systems Institute at UWM" Sponsored by **Rockwell Automation**, $136,379, **A. Nasiri, Principal Investigator.**

[2] "Establishing Connected Systems Institute (CSI) at UWM" **Rockwell Automation**, $3,050,000 (in three installments); 2017-2019.

[3] "Establishing Connected Systems Institute (CSI) at UWM" **We Energies**, $1M, 2018.

[4] "Establishing Connected Systems Institute (CSI) at UWM" **Wisconsin Economic Development Corporation** (WEDC), $900K; 2017-2019.

[5] "Small and Medium Business Readiness Program" **Wisconsin Economic Development Corporation** (WEDC), $250K; 2019-2021.

[6] "Advanced Wind Turbine Topology and Controls to Improve Transient Power Stability and Provide Short-Term Support," Sponsored by UWM RGI; $181,524; 2012-2013, **A. Nasiri, Principal Investigator**.

[7] "Power Smoothing and Low Voltage Ride Through Solutions for Wind Turbines", 2008-2009, Sponsored by University of **Wisconsin Research Growth Initiative**, $122K, **A. Nasiri, Primary Investigator**.

[8] "Wireless power transfer to implanted electronic devices" 2006-2007, Sponsored by University of Wisconsin-Milwaukee: **MiTAG Award**, $50K, **A. Nasiri, Primary Investigator**.

C. Established the Connected Systems Institute (CSI) (https://uwm.edu/csi/)

The vision is an internationally recognized, multidisciplinary Institute, a collaboration among Microsoft, Rockwell Automation, We Energies Johnson Controls, State Government and other industry leaders, with an initial focus on industrial Internet of Things (IoT). The Institute will be a campus-wide entity to provide education, conduct research, and offer programs to develop talent, expertise, and solutions to lead companies to greater productivity through IoT technologies and applications. Major focus of the institute is on advanced manufacturing, product life cycle, and asset management. Prof. Nasiri has served as the main point of contact for establishing the institute and now as interim executive director.

The CSI benefits the participating members in many ways, including conducting advanced research in the areas of industrial IoT, training talent with expertise in IoT suites and products, and connecting member companies to large, medium and small businesses in need of support in the IoT area. UWM teams led by Prof. Nasiri have visited domestic and global companies and educational institutions, including Microsoft's IoT Innovation Center in Taiwan and lab in Munich, the Fraunhofer Institute in Berlin, IBM's IoT Center in Munich, and several Rockwell Automation Connected Enterprise test beds, to identify areas of collaboration, refine the CSI's focus areas, and develop a unique portfolio of research and education initiatives. The team continues to meet with companies to assess their interest and needs and to recruit them as members. Interest is very strong. UWM asks for financial support from member companies in the form of a one-time investment and/or multi-year membership commitment. Planning for the CSI started in Spring 2017 and the core facility will be inaugurated in fall 2019.

D. Established GRAPES Site at UWM (http://people.uwm.edu/grapes/)

Grid-connected Advanced Power Electronics Systems (GRAPES) center is an NSF Industry/University Cooperative Research Center (I/UCRC) to develop long-term partnerships among industry, academe, and government. These centers are catalyzed by an investment from the NSF and are primarily supported by industry center members, with NSF taking a supporting role in the development and evolution of the center. GRAPES was established in 2010 with University of Arkansas as the lead and University of South Carolina as an additional site. Its mission is to accelerate the adoption and insertion of power electronics into the grid in order to improve system stability, flexibility, robustness, and economy.

Prof. Nasiri has established a GRAPES site at UWM with financial support from We Energies, DRS Technologies, Eaton Corporation, American Transmission Company, S&C Electric, Rockwell Automation, and G&W Electric (each at $40K/year) and $100K per year from NSF during phase II. GRAPES research is focused on electrical energy conversion devices, systems, and controls including energy storage, renewable energy systems, microgrids, and power converters.

E. Established Center for Sustainable Electrical Energy Systems (http://people.uwm.edu/sees/)

This Center brings together the capabilities of existing Laboratories and Centers within UWM College of Engineering & Applied Science and enhances the collaborations within UWM and with other groups and organizations in Wisconsin. Historically, Wisconsin is a leader in energy, power and control benefiting of a high concentration of world leading companies operating in the industry of electric power equipment. One of the main objectives of the Center is to actively contribute, through collaboration between academia and industry, to strengthening this leadership in the area of novel technologies.

The Center provides a framework for multi-disciplinary research and teaching activities for energy, which represents a strategic area for UWM growth. The main focus of the Center is on the topics of electric energy with particular emphasis on future sustainable developments. This includes, for example, several research projects on microgrids that includes distributed renewable energy generation with solar PV, wind turbines, bio-diesel generators, cybersecurity, energy storage systems and specific controls. The projects aim to develop a large-scale demonstrator and test bed with a power rating in the hundreds of kW range.

F. Established Power Electronics and Electric Drives Laboratory

- **Power Electronics Specifications:** Located at USR 291, 2200 sq-ft, over 250kVA power capability, ten work benches.
- **Energy Storage and Microgrid:** Located at USR 295, 1850 sq-ft, over 250kVA power capability, twelve work benches.
- **Equipment:** Three dSpace systems, Yokogawa WT 500 and WT 1800 power analyzers, TI DSP boards, NI Compact RIO and computers, FPGA-based test setups, high power AC and DC sources, energy storage devices, dynamometers, 500 MHZ, 4-channel Lecroy LT364L oscilloscope with PMA1 power measure analysis software and current probes, two 4-channel, 250MHz Tetronix 4054 oscilloscopes, power electronics components including switches, gate drivers, and heat sinks, full packages of MATLAB/Simulink, dSpace systems, PSIM, PSS/E, and PSCAD for software simulation.
- **Collaborators:** Eaton Corporation, Johnson Controls, Rockwell Automation, We Energies, Regal Beloit, GE Healthcare, GE Global Research, Caterpillar Mining, ZBB Energy, Kohler, Wisconsin Energy Research Consortium, JSR Micro, National Renewable Energy Laboratory, UW-Madison, Marquette University, University of Arkansas, University of South Carolina, etc.
- **Research Funding:** From various sources including DOE, NSF, DOD, GRAPES, and industry. Details are provided in section II.B.
- **Projects:** Various projects on renewable energy integration, energy storage, power conversion, microgrids, etc.

III. EDUCATIONAL ACHIEVEMENT

A. Experience as a teacher.

1. Courses taught.

Semester	Course	Title	Credit Hours	Level	Number of Students
Fall 05	575-001	Analysis of Electric Machines and Motor Drives	3	Grad/Under Grad.	11
Spr 06	572-001	Power Electronics	3	Grad/Under Grad	8
Fall 06	490/890	Special Topic (Adv. Power Electronics)	3	Grad/Under Grad.	4
Fall 06	575-001	Analysis of Electric Machines and Motor Drives	3	Grad/Under Grad.	13
Spr 07	572-001	Power Electronics	3	Grad/Under Grad.	21
Spr 07	362-401	Electromechanical Energy Conversion	3	Under Grad.	19
Fall 07	362-401	Electromechanical Energy Conversion	3	Under Grad.	19
Fall 07	890-003	Special Topic (Adv. Power Electronics)	3	Grad	8
Sum 07	362-471	Electromechanical Energy Conversion	3	Under Grad.	4
Spr 08	781-001	Advanced Synchronous Machinery	3	Grad.	11
Fall 08	362-401	Electromechanical Energy Conversion	3	Under Grad.	21
Spr 09	362-401	Electromechanical Energy Conversion	3	Under Grad.	13
Spr 09	890-006	Special Topic (Adv. Power Electronics)	3	Grad	5
Fall 09	490/890	Special Topic (Renewable Energy Systems)	3	Grad/Under Grad	32
Spr 10	572-001	Power Electronics	3	Grad/Under Grad	35
Fall 10	490/890	Controls for Renewable Energy	3	Grad/Under Grad	22
Spr 11	490/890	Special Topic (Renewable Energy Systems)	3	Grad/Under Grad	35
Fall 12	490/890	Special Topic (Adv. Power Electronics)	3	Grad/Under Grad	29
Fall 12	490/890	Special Topic (Renewable Energy Systems)	3	Grad/Under Grad	17
Spr 13	781-001	Advanced Synchronous Machinery	3	Grad.	12
Fall 13	490/890	Special Topic (Renewable Energy Systems)	3	Grad/Under Grad	15

Spr 14	490/890	Controls for Renewable Energy	3	Grad/Under Grad	18
Fall 14	890	Special Topic (Adv. Power Electronics)	3	Grad	15

The candidate also taught the following independent study courses:

Semester	Course	Title	Credit Hours	Level	Number of Students
Spr 11	999-019	Independent Study	3	Grad	3
Fall 09	999-019	Independent Study	3	Grad	2
Fall 09	699-019	Independent Study	3	Under Grad.	1
Fall 07	699-019	Independent Study	3	Under Grad.	5
Spr 07	999-019	Independent Study	3	Grad.	4
Spr 06	999-020	Independent Study	3	Grad.	2
Fall 09	999-020	Independent Study	3	Grad.	2
Spr 11	999-020	Independent Study	3	Grad.	2
Fall 11	999-020	Independent Study	3	Grad.	3
Spr 12	999-020	Independent Study	3	Grad.	5
Spr 13	999-020	Independent Study	3	Grad.	2
Fall 14	999-020	Independent Study	3	Grad.	4
Fall 15	999-020	Independent Study	3	Grad.	2
Fall 16	999-020	Independent Study	3	Grad.	3
Spr 17	999-020	Independent Study	3	Grad.	2
Fall 18	999-020	Independent Study	3	Grad.	4

2. Supervisory responsibility for courses taught by others.

The following courses have been taught by teaching assistants or ad hoc faculty. However, the applicant supervised the course, provided course syllabus and class notes, and provided guidance to the instructor.

Each semester since Spr 08	362-401	Electromechanical Energy Conversion	3	Under Grad.	Variable

Fall Semester, since Fall 09	575-001	Analysis of Electric Machines and Motor Drives	3	Grad/Under Grad.	Variable
Fall 08	471-001	Electric Power Systems	3	Grad/Under Grad.	9
Spr Semester, since Spr 09	572-001	Power Electronics	3	Grad/Under Grad.	Variable
Spr 09	781-001	Advanced Synchronous Machinery	3	Grad.	11

3. Responsibility for supervising teaching assistants and lecturers.

The applicant supervised teaching assistants for the following courses.

Semester	Course	Title	Credit Hours	Level	Number of Students
Each semester since Spr 07	362-401	Electromechanical Energy Conversion	3	Under Grad.	Variable

4. Research Associates (Postdoctoral Fellows)

1. Dr. Nasim Yahyasoltani; Research Focus: Statistical signal processing, optimization, machine learning, and network science with applications to smart power grid, communication networks, and big data analytics.
2. Dr. Mehdy Khayamy; Research Focus: Application of power electronic converters on a power system.

5. Visiting Professors

3. Dr. Ping Wang; Research Focus: Ultra fast controllers for power electronics converters, Chongqing University, China, 2017-2018.
4. Dr. Saban Ozdemir, Research Focus: Solar PV integration, Gazi University Turkey, 2017-2019.
5. Dr. Necmi Altin, Research Focus: Solar PV and energy storage integration, Gazi University Turkey, 2017-2019.
6. Dr. Ramazan Bayindir, Research Focus: Controls for power electronics converters, Gazi University Turkey, 2013-2014.
7. Dr. S. Hesam Sadeghi, Research Focus: Fault management in microgrid systems, Amirkabir University of Technology, Tehran, Iran, 2015-2016.
8. Dr. Dan Ionel, Research Focus: Electric machines for renewable energy systems and energy efficiency, Regal Beloit Co., Milwaukee, WI, 2013-2015.

6. Undergraduate and graduate research projects, theses and dissertations directed.

The applicant **supervised** the following Ph.D. Dissertations at the University of Wisconsin-Milwaukee:

1. Modeling and Simulation of Conducted EMI Noise Generated in the Electric Power Converters of the Electric and Hybrid Electric Vehicles. (2008). **Ph.D. Dissertation**. Dr. Youn Hee Lee, Senior Power Electronics Engineer, GM, Detroit, MI.

2. Integration of the Permanent Magnet Synchronous Generator Wind Turbines into Power Grid. **Ph.D. Dissertation**. (2008). Dr. Asghar Abedini, Assistant Professor, KNT University of Technology, Tehran, Iran.

3. Series Voltage Compensation for Doubly-Fed Induction Generator Wind Turbine Low Voltage Ride-Through Solution. (2010) **Ph.D. Dissertation**. Dr. Omar Abdel-Baqi, Senior Engineering Specialist, Caterpillar Mining, South Milwaukee, WI.

4. Transient Stability Improvements for Wind Turbines using Ultracapacitors. (2010) **Ph.D. Dissertation**. Dr. Tin Luu, Electrical Engineer, DRS Technologies, Milwaukee, WI.

5. Lithium-Ion Ultracapcitor Energy Storage Integrated with a Variable Speed Wind Turbine for Improved Power Conversion Control. (2012) **Ph.D. Dissertation**. Dr. Goran Mandic, Lead Engineer, Eaton Corporation.

6. Energy Storage for Short-Term and Long-Term Wind Energy Support. (2012) **Ph.D. Dissertation**. Dr. Ali Esmaili, Electrical Engineer, Caterpillar Mining, South Milwaukee, WI.

7. SCR-Based Wind Energy Conversion Circuitry and Controls for DC Distributed Wind Farms. (2012) **Ph.D. Dissertation**. Dr. Ravi Nanayakkara, Senior Hardware Engineer, Rockwell Automation, Milwaukee, WI.

8. Multi-Level Medium Voltage Inverter for DC Distributed Wind Farm to Establish Grid Interface and Provide Ancillary Support. (2012) **Ph.D. Dissertation**. Dr. Yogesh Patel, Senior Hardware Engineer, Rockwell Automation, Mequon, WI.

9. Integrated Li-Ion Ultracapcitor with Lead Acid Battery for Vehicular Start-Stop. (2015) **Ph.D. Dissertation.** Dr. Emad Manla, Assistant Professor, West Texas A&M University.

10. DC Line-Interactive Uninterruptible Power Supply (UPS) with Load Leveling for Constant Power and Pulse Loads. (2016) **Ph.D. Dissertation**. Dr. Ahmad Hamidi, Lead Engineer, Milwaukee Tools.

11. Virtual Droop Control Framework and Stability Analyses for Microgrids with High Penetration of Renewables. (2015) **Ph.D. Dissertation**. Dr. Ashsih Solanki, Lead Engineer, S&C Electric, Franklin, WI.

12. Transient Control of Synchronous Machine Active and Reactive Power in Micro–grid Power Systems. (2016) **Ph.D. Dissertation**. Dr. Luke Weber, Assistant Professor, Milwaukee School of Engineering.

13. Design and Implementation of a True Decentralized Autonomous Control Architecture for

Microgrids (2017) **Ph.D. Dissertation**. Dr. Salam Bani-Ahmad, Lead Engineer, Eaton Corporation.

14. Design and Implementation of a Multi-port Solid State Transformer for Flexible DER Integration (2017) **Ph.D. Dissertation**. Dr. Mohammad Rashidi, Lead Engineer, Eaton Corporation.

15. Modulation and Control Techniques for Performance Improvement of Microgrid Tie Inverters (2020) **Ph.D. Dissertation**. Dr. Zeljko Vrankovic, Lead Engineer, Rockwell Automation.

16. Modular Multi-Level Converters with Module Level Energy Storage for Medium Voltage Applications (2021) **Ph.D. Dissertation**. Dr. Bora Novakovic, Lead Engineer, Rockwell Automation.

The applicant **supervised** the following M.S. Thesis at the University of Wisconsin-Milwaukee:

1. Medical Grade High Frequency Power Distribution Units. (2012). **M.S. Thesis**. Mr. Ezana Mekonnen, Development Engineer, GE Healthcare, Waukesha, WI.

2. Coupled Electromagnetic and Thermal Analysis and Design Optimization of Synchronous Electric Machines. (2014). **M.S. Thesis**. Ms. Yi Wang.

3. Optimal DC Power Distribution System Design for Data Center with Efficiency Improvement. (2014). **M.S. Thesis**. Mr. Danny Wang, Hardware Engineer, Rockwell Automation, Mequon, WI.

4. Modeling and Protection Scheme for IEEE 34 Radial Distribution Feeder with and without Distributed Generation. (2014). **M.S. Thesis**. Mr. Sidharth Ashok, Project Engineer, National Grid, New York, NY.

5. Design and Implementation of a Solar Powered Electric Golf Cart. (2011). **M.S. Thesis**. Mr. Milad Pashapoor, Electrical Engineer, Miller Electric, Appleton, WI.

6. Turbine-Level Energy Storage for Wind Energy LVRT Support. (2012). **M.S. Thesis**. Mr. Ali Yousef.

7. X-ray Tube Induction Motor Design Optimization Technique. (2010). **M.S. Thesis**. Mr. Eric Biehr, Senior Development Engineer, GE Healthcare, Waukesha, WI.

8. Novel Battery Charger For Automotive Applications. (2006). **M.S. Thesis**. Mr. Zoran Vrankovic, Senior Electrical Engineer, Rockwell Automation, Mequon, WI.

9. A Linear Generator for Powering Implanted Electronics Devices. (2008). **M.S. Thesis**. Mr. Salaheddin A. Zabalawi, Engineer, Honeywell Process Solutions, Abu Dhabi, U.A.E.

10. Modeling of a Zinc Energy Storage System for Renewable Energy Systems. (2009). **M.S. Thesis**. Mr. Emad Manla, Ph.D. Candidate, UWM.

11. Development of an Amphibious Robot for Environmental Monitoring. (2009). **M.S.**

Thesis. Mr. Brian R. Ardaugh.

12. Maximum power point tracking algorithm for PM wind turbines, (2009). **M.S. Thesis.** Mr. Thomas Laubenstein, Senior Development Engineer, ZBB Energy, Menomonee Falls, WI.

13. Energy Storage Integrated with Building Efficiency, (2015). **M.S. Thesis.** Ms. Azadeh Mazaheri.

14. Wireless Power Transfer for Lighting, (2016). **M.S. Thesis.** Mr. Ayetullah Biten.

15. Theory, Simulation, and Implementation of Grid Connected Back to Back Converters Utilizing Voltage Oriented Control (2017). **M.S. Thesis.** Mr. Sean Cunningham.

16. Power Conversion System for Grid-connected Micro Hydro Power Systems with Maximum Power Point Tracking (2017). **M.S. Thesis.** Mr. Zhouyu Jiang.

17. Analytical Study Based Optimal Placement of Energy Storage Devices in Distribution Systems to Support Voltage and Angle Stability (2017). **M.S. Thesis.** Mr. Yih Der Kuo.

18. Inductance Measurement Fixture and Mathematical Model Development to Support AC Drive System (2017). **M.S. Thesis.** Mr. Gary Jean-Pierre.

19. Modeling of a Multi-Port High Frequency Transformer (2018). **M.S. Thesis.** Mohammad D. Gaffar.

20. Highly Efficient High Power Electric Vehicle Battery Charger (2018). **M.S. Thesis.** Yuqi Wei.

Selected Co-Advisor /Thesis Committee:

(Ph.D.) Dr. Dudley Outcalt (Electrical Engineering)
(Ph.D.) Dr. Kalu Bhattarai (Electrical Engineering)
(Ph.D) Dr. Kehan Yu (Mechanical Engineering)
(Ph.D.) Dr. Qiang Fu (Electrical Engineering)
(Ph.D) Dr. Amirhossein Shahirinia (Electrical Engineering)
(Ph.D) Dr. Mustafa Farrah (Electrical Engineering)
(Ph.D) Dr. Arash Kialashaki (Mechanical Engineering)
(M.S.) Mr. Sourabh Kumar (Mechanical Engineering)
(M.S.) Mr. Luke G. Weber (Electrical Engineering)
(M.S.) Mr. Justin Creaby (Mechanical Engineering)
(M.S.) Ms. Sibei Mi (Electrical Engineering)
(M.S.) Mr. Xiaoxuan Lou (Electrical Engineering)

Selected Non-Thesis M.S. Graduates:

Eric J. Barbiaux (Electrical Engineering)
Sohail M. Majeed, (Electrical Engineering)
Nooshin Nekooei, (Electrical Engineering)
Anthony M. Weber, (Electrical Engineering)
Erik A. Ackerman, (Electrical Engineering)
Timothy Reichert, (Electrical Engineering)

Kunowski, Kelly, (Electrical Engineering)
Kunfira, Francis, (Electrical Engineering)
Tensing Duraisingam, (Electrical Engineering)
Raed Alawfi, (Electrical Engineering)
Sameer Chandra (Electrical Engineering)

Current Students:

1. Mr. Ali Yousef, Ph.D. Student, Working on compact energy storage conversion systems, -Expected to graduate in Dec 2022.

2. Fanglue Ju, Ph.D. Student, Working on SiC-based high power converters, -Expected to graduate in Dec 2021.

3. Ahmad Issam El Shafei, Ph.D. Student, Microgrids, Energy Storage, and Battery Management System Design, -Expected to graduate in Dec 2022.

4. Gary Jean-Pierce, Ph.D. Student, Controls, Power Electronics, Renewable Energy, -Expected to graduate in Dec 2021.

5. Hadi Akbari Haghighat, Ph.D. Student, Microgrids Control, -Expected to graduate in May 2022.

6. Parthkumar Bhuvela, Ph.D. Student, Converter Control, -Expected to graduate in May 2023.

7. Megan Eckroth, M.S. student, -Expected to graduate in May 2022.

8. Ian Buck, M.S. student, -Expected to graduate in May 2022.

7. Attendance at workshops, institutes, short courses, etc., relating to improvement of teaching.

1. "Communication and Effective Messaging", October 3, 2018, Oratium.
2. "Enabling Advanced Power Electronics Technologies for the Next Generation Electric Utility Grid" workshop, July 17-18, 2018, Sandia National Laboratory.
3. "Executive Education on Connected Systems" 4-day training, May 9-10, June 20-21, 2018, UWM Lubar School of Business.
4. Attended a three-day faculty workshop: ONR/NSF-sponsored Workshop on Power-related Curricular Reform, Napa, California, February 4-5, 2011.
5. Attended a one-week faculty workshop: 2009 ONR-NSF-EPRI-AEP Faculty Workshop: Integrated Electric Energy Systems Curriculum, Corvallis, Oregon, July 21-25, 2009.
6. Attended a faculty workshop: Teaching First Course in Power Electronics and Power Systems, February 2006, Orlando, Florida.
7. Completed 8 hours of NABCEP CEUs for Residential Grid-Tie PV System Design and Installation Training, American Solar Energy Society, May 2009, Buffalo, NY.
8. Completed 40 hours of Photovoltaic Technical and Business Training, American Solar Energy Society, May 2009.

B. Creativity and scholarship in teaching.

1. Publications: textbooks, laboratory manuals, articles in journals oriented toward teaching.

Laboratory manual: For EE362: Electromechanical Energy Conversion, the candidate used the additional tuition fund to modify the laboratory completely. The equipment in the lab were outdated and mostly could not operate properly. The entire lab setup including electrical machines, power supplies, measurement equipment and loads were purchased and installed in the lab. The new equipment allow for additional tests since they provide variable AC voltage and variable speed prime mover/braking load. The equipment also provide digital display of torque and speed in the test setup. A lab manual was developed for the course with the new equipment for eight labs as follows:

1- Single- and Three-Phase Power Measurements
2- Single-Phase Transformers
3- Three-Phase Transformers
4- Synchronous Generators
5- Synchronous Motors
6- Induction Motors
7- DC Motors
8- Power Electronics

For the course, the applicant has added using Matlab software for small simulation questions in the homework.

2. Grants for teaching.

"Additional tuition grant for Electromechanical Energy Conversion Laboratory" College of Engineering and Applied Sciences, UWM, $84,357.68, 2006.

"Additional tuition grant for Electromechanical Energy Conversion Laboratory" College of Engineering and Applied Sciences, UWM, $42,253.00, 2010.

"Additional tuition grant for Power Electronics and Electric Drives Laboratory" College of Engineering and Applied Sciences, UWM, $46,875.90, 2013.

3. Initiation of new courses, programs, curricula.

1. New Course: The applicant has developed and taught **EE890: Advanced Power Electronics** in fall 06, fall 07, spring 09, and fall 12. The course includes the following topics:

- Single-phase and multi-phase controlled and uncontrolled rectifiers and inverters
- Pulse-Width-Modulation (PWM) techniques
- Resonant converters
- Multi-level converters
- Soft switching methods
- Low-voltage high-current design issues
- Advanced power electronic converters

- Techniques to model and control switching circuits

Simulation using software and term projects are parts of the course materials.

2. New Course: The applicant has developed and taught **EE478: Renewable Energy Systems** in the fall 2009 and fall 2012. The course includes the following topics:

- Wind power
- Wind speed and energy
- Wind power systems
- Wind generators
- Generator Drives
- Photovoltaic Power
- Photovoltaic power systems
- Energy Storage
- Grid connected systems

3. New Course: The applicant has developed the new course **Controls for Renewable Energy** (graduate) and taught in fall 2010. The course includes the following topics:

- Wind energy power conversion systems
- Solar energy power conversion systems
- Grid-tied PWM converters: modulation and controls (current and voltage)
- Grid requirements for Distributed Generation (DG) systems
- Filters and filtering requirements for grid-tied converters
- Grid synchronization
- Controls for multi-level converters
- Islanding detection and controls for DGs
- Non-linear controls for power converters
- Basics of wind turbine controls
- Optimal control of wind energy systems
- Linear parameter varying (LPV) control for wind turbine systems
- Controls for solar photovoltaic and solar thermal systems

4. New Course: The applicant has co-developed the new course **EE/ME-472: Introduction to Wind Energy** (undergraduate) and taught during spring 2010. The course includes the following topics:

- Introduction to Modern Wind Energy Systems (1)
- Wind Characteristics and Resources (2)
- Aerodynamics of Wind Turbines (3)
- Wind Turbine Loads and Rotor Dynamics (3)
- Electrical Aspects of Wind Turbines (4)
- Wind Turbine Components, Design and Testing (4)
- Wind Turbine Control (5)
- Wind Turbine Siting, System Design and Integration (4)
- Guest Lectures (2)

5. New Program: The candidate is a part of the faculty team who developed a new M.S. program at the College of Engineering & Applied Science at UWM with concentration on energy.

6. New Certificate: The candidate is a part of the faculty team who developed the Undergraduate Energy Certificate at the College of Engineering & Applied Science at UWM.

7. New MS Degree on Connected Systems: The candidate is currently leading the effort to establish a joint MS degree between UWM College of Engineering & Applied Science and Lubar School of Business. There are fourteen courses planned for this degree program, which will be developed by the units.

IV. SERVICE

A. Department and/or college; service on regular and ad hoc committees, task forces, administrative work, minority/disadvantaged programs, etc.

- Investigation Officer for Academic Misconduct, College of Engineering & Applied Science, 2020-.
- Member, Academic Planning Committee, College of Engineering & Applied Science, 2020-.
- Associate Dean for Research, College of Engineering & Applied Science, August 2015-February 2018.
- Chair, Industrial and Manufacturing Engineering Executive Committee, 2014-2015.
- Member: Awards and Recognition Committee-College of Engineering and Applied Science, University of Wisconsin-Milwaukee, 2008-2010.
- Developed new laboratory and lab manual for EE 362 using additional tuition fund.
- Attended and presented at CEAS open house for freshmen.
- Member of CEAS Diversity/Gender Initiatives Advisory Committee
- Member: Academic Planning Committee-College of Engineering and Applied Science, University of Wisconsin-Milwaukee, 2010-2011.
- Hosted McNair-sponsored undergraduate research student
- Hosted and supported undergraduate research students (three academic years)
- Hosted two Milwaukee Public School teachers for NSF RET program

B. University; university-wide committees, administrative work, etc.

- Faculty senate, Wisconsin-Milwaukee, 2008- 2010.
- Volunteered for University freshmen mentoring program.
- Executive Committee, Division of Natural Sciences, 2014- 2015
- Chair, Search Committee, UWM College of Engineering Energy Cluster

C. Community service.

1. Extension work; list courses taught, programs, etc.

- "Executive Education on Connected Systems" two hours, May 9-10, June 20-21, 2018, UWM Lubar School of Business.
- ANSYS Short Course: Optimal Design, Condition Monitoring and Fault Tolerance of Electric Machines and Drives, two hours, June 6 - 8, 2012.

- ANSYS Short Course: Power Electronics and Microgrid Control for Power System Applications, three hours, September 13-14, 2012.

- Tutorial: Power electronics and microgrid control for power system applications: introduction to microgrids, 4th International Conference on Power Engineering, Energy, and Electrical Drives (POWERENG 2013), May 2013, Istanbul, Turkey.

- Tutorial: Energy storage interfaces to grids and microgrids, 4th International Conference on Power Engineering, Energy, and Electrical Drives (POWERENG 2013), May 2013, Istanbul, Turkey.

2. Selected Public lectures, press, radio, TV, etc.

- Executive Profile, "UWM's Adel Nasiri crafts the future of connectivity", Milwaukee Business Journal, Feb. 21, 2019.
- "Developing the internet of things" Greater Milwaukee Today, June 26, 2019.
- "Connected Cluster: How the Milwaukee region advances in internet-connected industry" Milwaukee Business Journal, Dec 21, 2018.
- "Tomorrow's Network is Arriving Today: The Internet of Things looms large in changing the way things get done" Milwaukee Business Journal, Nov 2, 2018.
- "UWM researcher works to build largest microgrid" Milwaukee Journal Sentinel, July 19, 2014.
- "Major Project Underway in Milwaukee to Create Microgrids", **WUWM News (Milwaukee Public Radio)**, Dec 11, 2014 (http://wuwm.com/post/major-project-underway-milwaukee-create-microgrids)**.**
- Interview on Microgrids, **WUWM News (Milwaukee Public Radio)**, Jan 12, 2012.
- Interview on The Launch of UWM's Connected Systems Institute, **WUWM News (Milwaukee Public Radio)**, June 28, 2018.
- **Milwaukee Journal Sentinel,** July 17, 2009; Sep 20, 2010; Oct 4, 2011; Dec 9, 2013; July 20, 2014.
- **Today @ UWM**: May 19, 2009; September 12, 2013; June 16, 2014.

D. Professional.

1. Editing and reviewing.

- Paper Review Chair, IEEE Transactions on Industry Applications, Renewable and Sustainable Energy Conversion Committee, 2018-2019.
- Editor, IEEE Transactions on Smart Grid, 2013-2019.
- Editor, Journal of Electric Power Components and Systems, 2015-.
- Associate Editor, International Journal of Power Electronics, 2012-.
- Associate Editor, IEEE Transactions on Industry Applications, 2012-2017.
- Member, Scientific and Editorial Board, International Journal of Electric and Hybrid Vehicles (IJEHV)
- Member of Advisory Board, Milwaukee Regional Science and Engineering Fair (MRSEF)
- Reviewer and Session Chair, IEEE PESC, IECON, APEC, VPP, IAS Conferences

2. Membership and activities in professional societies

- Senior Member, IEEE
- Chair, IEEE IAS Renewable and Sustainable Energy Conversion Systems
- Past Chair, IEEE joint chapter on Industry Applications/Industrial Electronics Societies (IAS/IES), Milwaukee Section
- Member, Council of Energy Research and Education Leaders, National Council for Science and the Environment
- Member, IEEE Smart Grid Committee
- Member, IEEE IES Renewable Energy Systems Committee
- Member, IEEE SCC21 Standards Coordinating Committee on Fuel Cells, Photovoltaics, Dispersed Generation, and Energy Storage
- Member American Society of Engineering Education (ASEE) and ASEE Research Council.
- Co-chair, Mid-West Energy Research Consortium committee on Distributed Generations and Energy Storage.

3. Refereeing of journal articles, books, grant proposals, etc.

- Reviewer, IEEE Transactions on Vehicular Technology, Industrial Electronics, and Power Electronics
- Reviewer, National Science Foundation and U.S. Department of Energy
- Reviewer, IEEE conferences including IECON, APEC, IAS Annual Meeting, PES General Meeting

4. Panel participation.

- National Science Foundation (Engineering Research Center program, I/UCRC center program, and ECCS panels)
- U.S. Department of Energy Review Panels (ARPA-E and Energy Storage programs)

5. Participation in planning professional programs (Selected).

- Vice Chair, Smart Grid and Utility Applications, IEEE Energy Conversion Congress and Expo (ECCE 2016), September 2016, Milwaukee, WI.
- Chair, Renewable Energy Systems track, 18th Annual IEEE Conference on Industrial Technology (ICIT 2017), Toronto, Canada.
- Local Committee Chair, IEEE Energy Conversion Congress and Expo (ECCE 2016), September 2016, Milwaukee, WI.
- Co-chair, Mid-West Energy Research Consortium Microgrid Conference, June 2015, Milwaukee, WI.
- Co-Chair, Smart Grids & Renewable Energy, 24th IEEE International Symposium on Industrial Electronics, June 2015, Buzios, Brazil.

- Technical Program Committee, 37th IEEE International Telecommunication Energy Conference (INTELEC 201), October 2015, Osaka, Japan.
- General Chair, International Conference on Renewable Energy Research and Applications (ICRERA), October 21-24, 2014, Milwaukee, WI.
- General Chair, IEEE Symposium on Power Electronics & Machines for Wind and Water Applications (PEMWA 2014), July 24-26, 2014, Milwaukee, WI.
- Vice Chair, Smart Grid and Utility Applications, IEEE Energy Conversion Congress and Expo (ECCE 2013), September 2013, Denver, CO.
- General Chair, IEEE International Symposium on Sensorless Control for Electrical Drives (SLED 2012), September 21-22, 2012 in Milwaukee, WI.
- Topic Chair for Energy Storage, IEEE Energy Conversion Congress and Expo (ECCE 2012), September 2012, Raleigh, NC.
- Topic Chair for Renewable Energy, 38th Annual Conference of the IEEE Industrial Electronics Society (IECON 2012), November 2012, Montreal, Canada.
- Program Committee Member, 8th International Conference and Exhibition, on Ecological Vehicles and Renewable Energy (EVER2013), March 2013, Monaco.
- International Advisory Board, International Conference on Renewable Energy Research and Applications, ICRERA-2012, November 2012, Nagasaki, Japan.
- Topic Chair, Smart Grids & Renewable Energy, IEEE International Symposium on Industrial Electronics, Rio de Janeiro, Brazil, June 2015.
- Organizing Committee, 37th IEEE International Telecommunications Energy Conference, Osaka, Japan, October 2015.
- Vice Chair, Smart Grid and Utility Applications, IEEE Energy Conversion Congress and Expo (ECCE 2015), September 2015, Ontario, Canada.

E. Consulting activities.

Kohler Corporation, Caterpillar, Promega Corporation, We Energies, Eaton Corporation, Johnson Controls.