Behrooz Mirafzal

MCEC Distinguished Professor
Department of Electrical Engineering
University of South Calorina, Columbia, SC 29208

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Appointments:

MCEC Distinguished Professor, Department of Electrical Engineering, University of South Carolina	Columbia, SC 2025 - Present
Professor, Department of Electrical and Computer Engineering, Louie T. Marshall Engineering Professor ECE Graduate Program Director, Kansas State University	Manhattan, KS 2021 - 2025
Associate Professor, Department of Electrical and Computer Engineering, Kansas State University	Manhattan, KS 2015 - 2021
Assistant Professor, Department of Electrical and Computer Engineering, Kansas State University	Manhattan, KS 2011 –2015
Assistant Professor, Department of Electrical and Computer Engineering, Florida International University	Miami, FL 2008 –2011
Project Engineer, Research and Development Group of Standard Drives Division, Rockwell Automation	Mequon, WI 2005 - 2008
Adjunct Assistant Professor, Department of Electrical and Computer Engineering, Marquette University	Milwaukee, WI 2005 - 2008

Education:

Marquette University Ph.D. in Electrical Engineering	Milwaukee, WI, USA 2005
Isfahan University of Technology B.Sc. in Electrical Engineering	Isfahan, Iran 1994

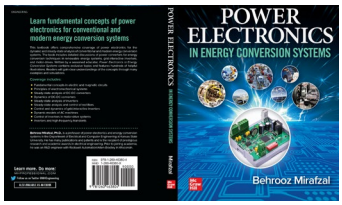
Honors and Recognitions:

- Louie T. Marshall Engineering Professorship, KSU, 2022-present
- Steve and Donna McKinnis Award, KSU, 2024
- IEEE IAS, Renewable Energy Committee, Second Best Prize Transactions Award, 2024
- Myers-Alford Memorial Teaching Award, KSU, 2023
- Larry E. and Laurel Erickson Public Service Award, KSU, 2022
- George Yeh Keystone Research Scholar, KSU, 2021-2025
- Michelle Munson-Serban Simu Keystone Research Scholar, KSU, 2017-2022
- Dean's Award of Excellence in Service, KSU, 2021
- IEEE IAS, Renewable Energy Committee, Third Best Prize Transactions Award, 2020
- Listed in the top 2% of researchers in the world (Field: Electrical and Electronics Eng.), according to 2020-23 studies done by Stanford University
- The 2019 Frankenhoff Outstanding Research Award, KSU, 2019

- Dean's Award of Excellence in Research, KSU, 2017
- NSF CAREER Award Recipient, 2014
- NSF EPSCOR First Award, 2012
- IEEE Power and Energy Society, Best Prize Transactions Award, 2012
- IEEE Industry Application Society, Second Best Prize Transactions Award, 2008
- Innovation Award, Rockwell Automation, December 2006
- IEEE Senior Member, December 2007
- IEEE IAS Associate Editor, Certificate of Recognition, 2013

Book: "Power Electronics in Energy Conversion Systems," by Behrooz Mirafzal, Publisher: McGraw-Hill, 450 pages, 2021.
ISBN: 9781260463804

This textbook features theoretical and practical coverage of the power electronics and electric machines required for the dynamic and steady-state analysis of modern energy conversion systems.



US Patents:

- B. Mirafzal, Jianbiao He, and Fariba Fateh, "Smart Coils for An Electric Motor," International Application Under the Patent Cooperation Treaty, August 2023, US Patent Application 63/267,641, Feb. 2022.
- B. Mirafzal, "Direct-Drive Wind Turbine Circuit Topology with Single-Stage Boost Inverters," US Patent No. 10,707,791, July 2020.
- B. Mirafzal, and C. R. Winterhalter, "Integrated DC Link Inductor and Current Sensor Winding," US Patent No. 8,373,952, February 12, 2013.
- B. Mirafzal, "Technique for High-Impedance Ground Fault Detection at the Common DC Bus of Multi-Axis Drives," US Patent No. 7,751,993, July 6, 2010.
- B. Mirafzal and N. A.O. Demerdash, "Method of Diagnosing a Broken Bar Fault in an Induction Motor," US Patent No. 7,081,760, 25th July 2006.

Journal Publications [(*) denotes graduate student]:

53. M. Sadoughi (*), F. Fateh, J. He and B. Mirafzal, "An Adaptive Method for Mitigating Overvoltage Stress on Motor Windings Driven by SiC Inverters," IEEE Transactions on Industrial Electronics, doi: 10.1109/TIE.2025.3574543.
52. M. T. Fard (*), J. He, L. Wei, R. Ilka, B. Mirafzal and F. Fateh, "Mitigation of Motor Reflected Overvoltage Fed by SiC Drives—A New Solution Based on Smart Coils," IEEE Transactions on Power Electronics, vol. 40, no. 3, pp. 4335-4344, March 2025.
51. M. Rajabinezhad (*), B. Mirafzal, F. Fateh, and S. Zuo, "A Q-Learning and Fuzzy Logic Control of Hybrid Energy Storage System Using Two Stage Low-Pass Filter to Smooth Power Fluctuations in Microgrid," International Journal of Robust and Nonlinear Control, John Wiley & Sons, Inc., Novmber 2024.
50. F. Sadeque (*), M. Gursoy (*), D. Sharma, and B. Mirafzal, "Autonomous Control of Inverters in Microgrid," IEEE Transactions on Industry Applications, vol. 60, no. 3, pp. 4313-4323, May-June 2024.
49. F. Sadeque (*), M. Gursoy (*), and B. Mirafzal, "Grid-forming inverters in a microgrid: Maintaining power during an outage and restoring connection to the utility grid without communication," IEEE Transactions on Industrial Electronics, vol. 71, no. 10, pp. 11796-11805, Oct. 2024.

48. T. Hossen (*), G. Amariucai and B. Mirafzal, "Integrating an analytical risk factor into a neural network framework for self-protective inverters," IEEE Journal of Emerging and Selected Topics in Power Electronics, vol. 12, no. 2, pp. 1535-1544, April 2024.
47. M. Gursoy (*), and B. Mirafzal, "Direct vs. indirect control schemes for grid-forming inverters–Unveiling a performance comparison in a microgrid," IEEE Access, vol. 11, pp. 75023-75036, 2023.
46. T. Hossen (*), and B. Mirafzal, "Hidden modes of instability for inverters in weak grids," IEEE Transactions on Industry Applications, vol. 59, no. 4, pp. 4505-4515, July-Aug. 2023.
44. F. Sadeque (*), and B. Mirafzal, "Frequency restoration of grid-forming inverters in pulse load and plug-in events," IEEE Journal of Emerging and Selected Topics in Industrial Electronics, vol. 4, no. 2, pp. 580-588, April 2023.
45. T. Hossen (*), M. Gursoy (*), and B. Mirafzal, "Self-protective inverters against malicious setpoints using analytical reference models," IEEE Journal of Emerging and Selected Topics in Industrial Electronics, vol. 3, no. 4, pp. 871-877, Oct. 2022.
43. D. Sharma, F. Sadeque (*), and B. Mirafzal, "Synchronization of inverters in grid forming mode, IEEE Access, vol. 10, pp. 41341-41351, 2022.
42. M.S. Pilehvar (*), D. Sharma, and B. Mirafzal, "Forming interphase microgrids in distribution systems using cooperative inverters," CPSS Transactions on Power Electronics and Applications, vol. 7, no. 2, pp. 186-195, June 2022.
41. J. Benzaquen (*), J. He, and B. Mirafzal, "Toward more electric powertrains in aircraft: Technical challenges and advancements," CES Transactions on Electrical Machines and Systems, vol. 5, no. 3, pp. 177 - 193, Sep. 2021.
40. B. Poudel, E. Amiri, P. Rastgoufard, and B. Mirafzal, "Toward less rare-earth permanent magnet in AC machines: A review," IEEE Transactions on Magnetics, vol. 57, no. 9, pp. 1-19, Sep. 2021.
39. F. Sadeque (*), J. Benzaquen (*), A, Adib (*), and B. Mirafzal, "Direct phase-angle detection for three-phase inverters in asymmetrical power grids," IEEE Journal of Emerging and Selected Topics in Power Electronics, vol. 9, no. 1, pp. 520-528, Feb. 2021.
38. Adib (*), F. Fateh, and B. Mirafzal, "Smart inverter stability enhancement in weak grids using adaptive virtual-inductance," IEEE Transactions on Industry Applications, vol. 57, no. 1, pp. 814-823, Jan./Feb. 2021.
37. M.S. Pilehvar (*), and B. Mirafzal, "Frequency and voltage supports by battery-fed smart inverters in mixed-inertia microgrids," Electronics 2020, 9, 1755.
36. Mirafzal, and A. Adib (*), "On grid-interactive smart inverters: features and advancements," IEEE Access, vol. 8, pp. 160526-160536, 2020.
35. J. Benzaquen (*), F. Fateh, and B. Mirafzal," On the dynamic performance of variable-frequency AC-DC converters," IEEE Transactions on Transportation Electrification, vol. 6, no. 2, pp. 530-539, June 2020.
34. J. Benzaquen (*), and B. Mirafzal, "Seamless dynamics for wild-frequency active rectifiers in more electric aircraft," IEEE Transactions on Industrial Electronics, vol. 67, no. 9, pp. 7135-7145, Sep. 2020.
33. J. Benzaquen (*), F. Fateh, M. B. Shadmand, and B. Mirafzal, "Performance comparison of active rectifier control schemes in more electric aircraft applications," IEEE Transactions on Transportation Electrification, vol. 5, no. 4, pp. 1470 – 1479, Dec. 2019.
32. Adib (*), K. K. Afridi, M. Amirabadi, F. Fateh, M. Ferdowsi, B. Lehman, L. H. Lewis, B. Mirafzal, M. Saeedifard, M. B. Shadmand, and P. Shamsi, "E-Mobility — advancements and challenges," IEEE Access, vol. 7, pp. 165226-165240, 2019.

31. Singh (*), and B. Mirafzal, “An efficient grid-connected three-phase single-stage boost current source inverter,” IEEE Power and Energy Technology Systems Journal**,** vol. 6, no. 3, pp. 142-151, Sep. 2019.
30. Adib (*), and B. Mirafzal, “Virtual inductance for stable operation of grid-interactive voltage source inverters,” IEEE Transactions on Industrial Electronics, vol. 66, no. 8, pp. 6002-6011, Aug. 2019.
29. J. Benzaquen (*), M. B. Shadmand, B. Mirafzal, “Ultrafast rectifier for variable-frequency applications,” IEEE Access, vol. 7, pp. 9903-9911, Jan. 2019.
28. M. Pilehvar (*), M. B. Shadmand, B. Mirafzal, “Analysis of smart loads in nanogrids,” IEEE Access, vol. 7, pp. 548 – 562, Jan. 2019.
27. Adib (*), J lamb (*), and B. Mirafzal, “Ancillary services via VSIs in microgrids with maximum DC-bus voltage utilization,” IEEE Transactions on Industry Applications, vol. 55, no. 1, pp. 648-658, Jan./Feb. 2019.
26. S. Choi, M. S. Haque, M. Tarek, V. Mulpuri, Y. Duan, S. Das, V. Garg, D. Ionel, M. Masrur, B. Mirafzal, and H. Toliyat, “Fault diagnosis techniques for permanent magnet AC machine and drives– A review of the current state of the art,” IEEE Transactions on Transportation Electrification, vol. 4, no. 2, pp. 444 – 463, June 2018.
25. J. Lamb (*), B. Mirafzal, and F. Blaabjerg “PWM common-mode reference generation for maximizing the linear modulation region of CHB converters in islanded microgrids,” IEEE Transactions on Industrial Electronics, vol. 65, no. 7, pp. 5250 – 5259, July 2018.
24. Singh (*), J. Benzaquen (*), and B. Mirafzal, “Current source generator-converter topology for direct-drive wind turbines,” IEEE Transactions on Industry Applications, vol. 54, no. 2, pp. 1663 – 1670, March/April 2018.
25. Adib (*), B. Mirafzal, X. Wang, and F. Blaabjerg “On stability of voltage source inverters in weak grids,” IEEE Access, vol. 6, pp. 4427 – 4439, Jan. 2018.
22. Singh (*), and B. Mirafzal, “Indirect boost matrix converter and low-voltage generator for direct-drive wind turbines,” The Journal of Engineering, Iss. 1, pp. 10-16, Nov. 2017.
21. Singh (*), and B. Mirafzal, “A generator-converter topology with zero DC-link impedance for direct-drive wind turbines,” IEEE Transactions on Energy Conversion, vol. 32, no. 4, pp. 1620–1623, Dec. 2017.
20. J. Lamb (*), and B. Mirafzal, “Grid-interactive cascaded H-bridge multilevel converter PQ plane operating region analysis,” IEEE Transactions on Industry Applications, vol. 53, no. 6, pp. 5744–5752, Nov./Dec. 2017.
19. J. Lamb (*), and B. Mirafzal, “Open-circuit IGBT fault detection and location isolation for cascaded multilevel converters,” IEEE Transactions on Industrial Electronics, vol. 64, no.6, pp. 4846 - 4856, June 2017.
18. J. Lamb (*), and B. Mirafzal, “An adaptive SPWM technique for cascaded multilevel converters with time-variant DC sources,” IEEE Transactions on Industry Applications, vol. 52, no. 5, pp. 4146 – 4155, September/October 2016.
17. J. Lamb (*), A. Singh (*), and B. Mirafzal, “Rapid implementation of solid-state based converters in power engineering laboratories,” IEEE Transactions on Power Systems, vol. 31, no. 4, pp. 2957 – 2964, July. 2016.
16. Singh (*), A. K. Kaviani (*), and B. Mirafzal, “On dynamic models and stability analysis of three-phase phasor PWM-based CSI for stand-alone applications,” IEEE Transactions on Industrial Electronics, vol. 62, no. 5, pp. 2698 – 2707, May 2015.
15. B. Mirafzal, "Survey of fault-tolerance techniques for three-phase voltage source inverters," IEEE Transactions on Industrial Electronics, vol. 61, no. 10, pp. 5192-5202, Oct. 2014.
14. S. Ochs (*), B. Mirafzal, and P. Stoodeh (*), "A method of seamless transitions between grid-tied and stand-alone modes of operation for utility-interactive inverters," IEEE Transactions on Industry Applications, vol. 50, no. 3, pp. 1934-1941, May/June 2014.

13. K. Kaviani (*), B. Hadley (*), and B. Mirafzal, "A time-coordination approach for regenerative energy saving in multi-axis motor-drive systems," IEEE Transactions on Power Electronics, vol. 27, no. 2, pp. 931 - 941, February 2012.
12. Sayed-Ahmed, B. Mirafzal, and N. Demerdash, "A fault-tolerant technique for Δ-connected AC motor-drives," IEEE Transactions on Energy Conversion, vol. 26, no. 2, pp. 646 - 653, June 2011. (*IEEE Transactions IEEE PES Society Paper Award*)
11. B. Mirafzal, M. Saghaleini (*), and A. K. Kaviani (*), "An SVPWM-based switching pattern for stand-alone and grid-connected three-phase single-stage boost-inverters," IEEE Transactions on Power Electronics, vol. 26, no. 4, pp. 1102 - 1111, April 2011.
10. V. Salehi (*), S. Afsharnia, and B. Mirafzal, "Voltage stability improvement for wind farms using shunt FACTS devices based on dynamic modeling," International Journal of Distributed Energy Resources, ISSN 1614-7138, vol.6, no. 2, pp. 109-130, April-June 2010.
9. B. Mirafzal, G. Skibinski, and R. Tallam, "A failure mode for PWM inverter-fed AC motors due to the antiresonance phenomenon," IEEE Transactions on Industry Applications, vol. 45, no. 5, pp. 1697-1705, September/October 2009.
8. B. Mirafzal, G. Skibinski, and R. Tallam, "Determination of parameters in the universal induction motor model," IEEE Transactions on Industry Applications, vol.45, no. 1, pp. 142 - 151, January/February 2009.
7. B. Mirafzal, G. Skibinski, R. Tallam, D. Schlegel, and R. Lukaszewski, "Universal induction motor model with low-to-high frequency response characteristics," IEEE Transactions on Industry Applications, vol.43, no. 5, pp. 1233 - 1246, September/October 2007. (*IEEE Transactions IEEE IAS Society Paper Award*)
6. B. Mirafzal, R. Povinelli, and N. Demerdash, "Inter-turn fault diagnosis in induction motors using pendulous oscillation phenomenon," IEEE Transactions on Energy Conversion, vol.21, no. 4, pp.871-882, December 2006.
5. M. Solveson, B. Mirafzal, and N. Demerdash, "Soft started induction motor modeling and heating issues for different starting profiles using a flux linkage ABC-frame of reference," IEEE Transactions on Industry Applications, vol.42, no. 4, pp.973-982, July/August 2006.
4. B. Mirafzal, and N. Demerdash, "On innovative methods of induction motor inter-turn and broken-bar fault diagnostics," IEEE Transactions on Industry Applications, vol.42, no. 2, pp.405-414, March/April 2006.
3. B. Mirafzal, and N. Demerdash, "Effects of load magnitude on diagnosing broken bar faults in induction motors using the pendulous oscillation of the rotor magnetic field orientation," IEEE Transactions on Industry Applications, vol.41, no. 3, pp.771-783, May/June 2005.
2. B. Mirafzal, and N. Demerdash, "Induction machine fault diagnosis using the rotor magnetic field space vector orientation," IEEE Transactions on Industry Applications, vol.40, no. 2, pp.534-542, March/April 2004.
1. M. Mirafzal, and B. Mirafzal, "On the oscillation problem of second nonlinear Euler type differential equations," International Journal of Differential Equations and Applications, vol.9, pp.187-198, 2004.

Conference Publications [(*) denotes graduate student]:

93. Y. Abdolahi (*), B. Mirafzal, F. Fateh, "DL-Predictive Control of GFM Inverters for Inrush Current Mitigation and Overload Protection," 2025 IEEE Kansas Power and Energy Conference (KPEC), Manhattan, KS, USA, 2025, pp. 1-6.
92. A. Sadasivan (*), B. Mirafzal, "High-Power Planar Transformer Design for Four-Port Converters," 2025 IEEE Applied Power Electronics Conference and Exposition (APEC), Atlanta, GA, USA, 2025, pp. 2461-2467.
91. M. Sadoughi (*), F. Fateh, J. He and B. Mirafzal, "Challenges and Solutions for Uneven Voltage Distribution in SiC-Driven AC Motors," 2024 IEEE Energy Conversion Congress and Exposition (ECCE), Phoenix, AZ, USA, 2024, pp. 2151-2156.

90. M. Sadoughi (*), F. Fateh and B. Mirafzal, "Overvoltage Stress on AC Motor Winding Insulations Driven by Fast-Switching Inverters: A Study," 2024 IEEE Kansas Power and Energy Conference (KPEC), Manhattan, KS, USA, 2024, pp. 1-6.
89. A. Sadasivan (*), F. Fateh and B. Mirafzal, "Design of Planar Transformers for Multiport Converters: A Study," 2024 IEEE Kansas Power and Energy Conference (KPEC), Manhattan, KS, USA, 2024, pp. 1-6.
88. F. Sadeque (*), M. Gursoy (*), F. Fateh and B. Mirafzal, "Control-Sync: A Method for Grid-Forming Inverters," 2024 IEEE Applied Power Electronics Conference and Exposition (APEC), Long Beach, CA, USA, 2024, pp. 1248-1254.
87. M. Sadoughi (*), A. Sadasivan (*), F. Fateh, J. He and B. Mirafzal, "Mitigation of Uneven Overvoltage Distribution in Motor Windings Fed by SiC-Based Drives Using a GaN-Based Adaptive Surge Impedance Method," 2024 IEEE Applied Power Electronics Conference and Exposition (APEC), Long Beach, CA, USA, 2024, pp. 2385-2391.
86. M. Gursoy (*), F. Sadeque (*), F. Fateh and B. Mirafzal, "Direct Control Methods for Grid-Forming and Grid-Following Inverters," 2023 IEEE Energy Conversion Congress and Exposition (ECCE), Nashville, TN, USA, 2023, pp. 1081-1088.
85. M. Sadoughi (*), A. Sadasivan (*), A. Howard (*), F. Fateh, J. He and B. Mirafzal, "Mitigating High-Frequency Overvoltage on Motor Windings: An Adaptive Approach," 2023 IEEE Energy Conversion Congress and Exposition (ECCE), Nashville, TN, USA, 2023, pp. 5170-5176.
84. F. Sadeque (*), M. Gursoy (*) and B. Mirafzal, "Survey of Control Methods for Grid-Forming Inverters – Advancements from 2020 to 2023," 2023 IEEE Kansas Power and Energy Conference (KPEC), Manhattan, KS, USA, 2023, pp. 1-6.
83. T. Hossen (*) and B. Mirafzal, "A Study on Self-Security of Smart Inverters," 2023 IEEE Kansas Power and Energy Conference (KPEC), Manhattan, KS, USA, 2023, pp. 1-6.
82. T. Hossen (*) and B. Mirafzal, "Self-Protective Inverters for Enhancing the Security of Smart Power Grids," 2023 IEEE Kansas Power and Energy Conference (KPEC), Manhattan, KS, USA, 2023, pp. 1-6.
81. M. T. Fard (*), J. He, M. Sadoughi (*), B. Mirafzal, and F. Fateh, "Smart coils for mitigation of motor reflected overvoltage fed by SiC drives," in Proc. IEEE Applied Power Electronics Conference & Exposition (APEC), Orlando, FL, 2023, pp. 1429-1436.
80. T. Hossen (*), F. Sadeque (*), F. Fateh and B. Mirafzal, "Projection of safe operation for inverters using artificial intelligence-based stability criterion," in Proc. IEEE Applied Power Electronics Conference & Exposition (APEC), Orlando, FL, 2023, pp. 3083-3088.
79. F. Sadeque (*), D. Sharma, and B. Mirafzal, "Seamless grid-following to grid-forming transition of inverters supplying a microgrid," in Proc. IEEE Applied Power Electronics Conference & Exposition (APEC), Orlando, FL, 2023, pp. 594-599.
78. T. Hossen (*), and B. Mirafzal, "On stability of PQ-controlled grid-following and droop-control grid-forming inverters," in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Detriot, Michigan, Oct. 2022.
77. M. Gursoy (*), and B. Mirafzal, "Inrush current mitigation for grid-forming inverters in islanded microgrids," in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Detriot, Michigan, Oct. 2022.
76. F. Sadeque (*), and B. Mirafzal, "A universal controller for grid-forming inverters in microgrid during islanding for low transient current," in Proc. IEEE International Conference on Industrial Electronics: Developments & Applications, India, Oct. 2022, pp. 62-67.
75. M. Gursoy (*), and B. Mirafzal, "Dynamic load inrush current mitigation in islanded microgrids powered by grid-forming inverters," in Proc. IEEE International Conference on Industrial Electronics: Developments & Applications, India, Oct. 2022, pp. 73-77.
74. T. Hossen (*), and B. Mirafzal, "On projection of safe operation for grid-following inverters – Grid parameter estimation," in Proc. IEEE International Conference on Industrial Electronics: Developments & Applications, India, Oct. 2022, pp. 68-72.

73. F. Sadeque (*), D. Sharma, and B. Mirafzal, “Multiple grid-forming inverters in black-start: The challenges,” in Proc. IEEE Workshop on Control and Modeling for Power Electronics (COMPEL), Colombia, Nov. 2021.
72. F. Sadeque (*), D. Sharma, and B. Mirafzal, “Power-sharing between grid-forming and grid-following inverters,” in Proc. IEEE Workshop on Control and Modeling for Power Electronics (COMPEL), Colombia, Nov. 2021.
71. M. Gursoy (*), and B. Mirafzal, “Self-security for grid-interactive smart inverters using steady-state reference model,” in Proc. IEEE Workshop on Control and Modeling for Power Electronics (COMPEL), Colombia, Nov. 2021.
70. T. Hossen (*), D. Sharma, and B. Mirafzal, “Smart inverter twin model for anomaly detection,” in Proc. IEEE Workshop on Control and Modeling for Power Electronics (COMPEL), Colombia, Nov. 2021.
69. T. Hossen (*), M. Gursoy (*), and B. Mirafzal, “Digital twin for self-security of smart inverters,” in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Vancouver, Canada, Oct. 2021.
68. F. Sadeque (*), and B. Mirafzal, “Cooperative inverters to overcome PLL malfunctions,” in Proc. IEEE International Symposium on Power Electronics for Distributed Generation Systems (PEDG), Chicago, IL, June 2021.
67. M. Gursoy (*), and B. Mirafzal, "On self-security of grid-interactive smart inverters," in Proc. IEEE Kansas Power and Energy Conference (KPEC), 2021.
66. J. Benzaquen (*), and B. Mirafzal, "Smart active rectifier fed by a variable voltage and frequency source," in Proc. IEEE Kansas Power and Energy Conference (KPEC), 2021.
65. T. Hossen (*), F. Sadeque (*), M. Gursoy (*), and B. Mirafzal, "Self-secure inverters against malicious setpoints," in Proc. IEEE Electric Power and Energy Conference (EPEC), Edmonton, AB, Canada, 2020.
64. M. S. Pilehvar (*), and B. Mirafzal, "PV-fed smart inverters for mitigation of voltage and frequency fluctuations in islanded microgrids," in Proc. 2020 International Conference on Smart Grids and Energy Systems (SGES), 2020, pp. 807-812.
63. M. S. Pilehvar (*), and B. Mirafzal, "Smart inverters for seamless reconnection of isolated residential microgrids to utility grid," in Proc. 2020 IEEE Electric Power and Energy Conference (EPEC), 2020.
62. M. S. Pilehvar and B. Mirafzal, "Energy-storage fed smart inverters for mitigation of voltage fluctuations in islanded microgrids," in Proc. 2020 IEEE Electric Power and Energy Conference (EPEC), 2020.
61. M. S. Pilehvar (*), and B. Mirafzal, A frequency control method for islanded microgrids using energy storage systems,” in Proc. IEEE Applied Power Electronics Conference & Exposition (APEC), New Orleans, LA, 2020, pp. 2327-2332.
60. J. Benzaquen (*), and B. Mirafzal, “An active rectifier fed by a variable-speed generator,” in Proc. IEEE Applied Power Electronics Conference & Exposition (APEC), New Orleans, LA, 2020, pp. 1691-1696.
59. Adib (*), F. Fateh, and B. Mirafzal, “A stabilizer for inverters operating in grid-feeding, grid-supporting and grid-forming modes,” in Proc. IEEE Energy Conversion Congress and Exposition (ECCE), Baltimore, MD, 2019, pp. 2239-2244.
58. J. Benzaquen (*), A. Adib (*), F. Fateh, and B. Mirafzal, “A model predictive control scheme formulation for active rectifiers with LCL filter,” in Proc. IEEE Energy Conversion Congress and Exposition (ECCE), Baltimore, MD, 2019, pp. 3758-3763.
57. J. Benzaquen (*), M. B. Shadmand, F. Fateh, and B. Mirafzal, “Model reference adaptive one-step-ahead control scheme for active rectifiers in wild frequency applications,” in Proc. IEEE Applied Power Electronics Conference & Exposition (APEC), Anaheim, CA, March 2019, pp. 588-593.

56. M. S. Pilehvar (*), M. B. Shadmand, and B. Mirafzal, “Smart loads for power quality and battery lifetime improvement in nanogrids,” in Proc. IEEE Applied Power Electronics Conference & Exposition (APEC), Anaheim, CA, March 2019, pp. 1487-1493.
55. M. Easley (*), S. Jain, M. B. Shadmand, F. Fateh, and B. Mirafzal, “Hierarchical model predictive control for cascaded multilevel inverters,” in Proc. IEEE Applied Power Electronics Conference & Exposition (APEC), Anaheim, CA, March 2019, pp. 614-619.
54. S. D’silva (*), P. Nanduri, S. Jain, F. Fateh, M. B. Shadmand, and B. Mirafzal, “Autonomous power reserve control for cluster of photovoltaic sources in microgrids,” in Proc. IEEE Applied Power Electronics Conference & Exposition (APEC), Anaheim, CA, March 2019, pp. 167-173.
53. M. S. Pilehvar (*), J. Benzaquen (*), M. B. Shadmand, A. Pahwa, B. Mirafzal, J. McDaniel, D. Rogge, and J. Erickson, "Modeling, control, and stability of smart loads toward grid of nanogrids for smart cities," in Proc. IEEE Industrial Electronics Society Conf. (IECON), Washington DC, October 2018, pp. 4045-4050.
52. J. Benzaquen (*) and B. Mirafzal, "Asymmetrical multi-coil wireless EV charger with enhanced misalignment tolerance," in Proc. IEEE Industrial Electronics Society Conf. (IECON), Washington DC, October 2018, pp. 4781-4786.
51. Adib (*), F. Fateh, M. B. Shadmand, and B. Mirafzal, “A reduced-order technique for stability investigation of voltage source inverters,” in Proc. IEEE Energy Conversion Congress and Exposition (ECCE), Portland, OR, September 2018, pp. 5351-5356.
50. Adib (*), F. Fateh, M. B. Shadmand, and B. Mirafzal, “Weak grid impacts on stability of voltage source inverters - asymmetrical grid,” in Proc. IEEE Energy Conversion Congress and Exposition (ECCE), Portland, OR, September 2018, pp. 3055-3060.
49. Adib (*), F. Fateh, B. Mirafzal, “Weak grid impacts on the design of voltage source inverters — virtual inductance” in Proc. IEEE Workshop on Control and Modeling for Power Electronics (COMPEL), Padova, Italy, June 25-28, 2018.
48. J. Benzaquen (*), M. Shadmand, A. Stonestreet, and B. Mirafzal, “A unity power factor active rectifier with optimum space-vector predictive DC voltage control for variable frequency supply suitable for more electric aircraft applications,” in Proc. IEEE Applied Power Electronics Conf. (APEC), San Antonio, TX, March 2018, pp. 1455-1460.
47. Adib (*), J. Lamb (*), and B. Mirafzal, “Atypical PWM for maximizing 2L-VSI DC-bus utilization in inverter-based microgrids with ancillary services,” in Proc. IEEE Applied Power Electronics Conf. (APEC), Dallas, TX, March 2018, pp. 2343-2348.
46. S. Jain, M. Easley (*), M. B. Shadmand, B. Mirafzal, “Decoupled active and reactive power predictive control of impedance source microinverter with LVRT capability, in Proc. IEEE Power and Energy Conference, Illinois, Feb. 2018.
45. J. Lamb (*), and B. Mirafzal, “Active and reactive power operational region for grid-interactive cascaded H-bridge multilevel converters,” in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Milwaukee, WI, Sept. 2016.
44. Singh (*), and B. Mirafzal, “A generator-converter design for direct-drive wind turbines,” in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Milwaukee, WI, Sept. 2016.
43. Singh (*), and B. Mirafzal, “Three-phase single-stage boost inverter for direct-drive wind turbines,” in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Milwaukee, WI, Sept. 2016.
42. Singh (*), and B. Mirafzal, “A low-voltage generator-converter topology for direct-drive wind Turbines,” in Proc. IEEE International Symposium on Power Electronics for Distributed Generation Systems (PEDG), Vancouver, Canada, June 2016.
41. J. Lamb (*), and B. Mirafzal, “Active and reactive power operational region for grid-tied inverters,” in Proc. IEEE International Symposium on Power Electronics for Distributed Generation Systems (PEDG), Vancouver, Canada, June 2016.
40. O. Dag, and B. Mirafzal, “On stability of islanded low-inertia microgrids,” in Proc. 2016 Clemson University Power Systems Conference (PSC), 2016.

39. J. Lamb (*), and B. Mirafzal, “An adaptive SPWM technique for cascaded multilevel converters,” in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Montreal, QC, Sept. 2015, pp. 703- 708.
38. Singh (*), A. A. Milani (*), and B. Mirafzal, “Modified phasor pulse width modulation method in three-phase single-stage boost inverter,” in Proc. IEEE Applied Power Electronics Conf. (APEC), Dallas, TX, March 2014, pp. 1276-1280.
37. Singh (*), A. A. Milani (*), and B. Mirafzal, “Voltage regulation in single-stage boost inverter using modified phasor pulse width modulation method for stand-alone applications,” in Proc. IEEE Applied Power Electronics Conf. (APEC), Dallas, TX, March 2014, pp. 3011-3016.
36. D. S. Ochs (*), P. Sotoodeh (*), and B. Mirafzal, "A technique for voltage-source inverter seamless transitions between grid-connected and standalone modes," in Proc. IEEE Applied Power Electronics Conf. (APEC), Long Beach, CA, March 2013, pp. 954-959.
35. K. Kaviani (*), and B. Mirafzal, "Stability analysis of the three-phase single-stage boost inverter," in Proc. IEEE Applied Power Electronics Conf. (APEC), Long Beach, CA, March 2013, pp. 918-923.
34. K. Kaviani (*), and B. Mirafzal, “Dynamic model of three-phase single-stage boost inverter for grid-connected applications,” in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Raleigh, NC, Sept. 2012, pp. 4627- 4634.
33. Mirafzal, and S. Das, "Condition monitoring and fault-tolerance agents for grid-tied inverters," in Proc. IEEE Power and Energy Society General Meeting Conf., San Diego, CA, July 2012, pp. 1-3.
32. M. Saghaleini (*), and B. Mirafzal, “Reactive power control in a three-phase grid-connected current-source boost-inverter,” in Proc. IEEE Applied Power Electronics Conf. (APEC), Orlando, FL, February 2012, pp. 904-910.
31. K. Kaviani (*), B. Mirafzal, and K. Yen, “Dynamic model of three-phase current source boost inverter for stand-alone applications,” in Proc. IEEE Applied Power Electronics Conf. (APEC), February 2012, pp. 218-224.
30. K. Kaviani (*), and B. Mirafzal, “A switching pattern for single-phase single-stage current source boost inverter,” in Proc. IEEE Applied Power Electronics Conf. (APEC), Orlando, FL, February 2012, pp. 2066-2071.
29. M. Saghaleini (*), and B. Mirafzal, “Power control in three-phase grid-connected current-source boost inverter,” in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Phoenix, AZ, 2011, pp. 776 - 783.
28. K. Kaviani (*), B. Hadley (*), and B. Mirafzal, “Regenerative energy saving in multi-axis servo-motor-drives,” in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Phoenix, AZ, Sept. 2011, pp. 3450 - 3457.
27. H. Afshari (*), M. Saghaleini (*), A. K. Kaviani (*), B. Hadley (*), and B. Mirafzal, “A time-coordination approach for compensating pulse-load using flywheel,” in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Phoenix, AZ, Sept. 2011, pp. 109 - 115.
26. M. Saghaleini (*), A. K. Kaviani (*), B. Hadley (*), and B. Mirafzal, "New trends in photovoltaic energy systems," in Proc. 10th International Conference on Environment and Electrical Engineering Conf., June 2011.
25. Sayed-Ahmed, B. Mirafzal, and N. Demerdash, “A fault-tolerant technique for delta-connected vector-control AC motor-drives,” in Proc. IEEE Applied Power Electronics Conf. (APEC), Fort Worth, TX, March 2011, pp. 1034 - 1041.
24. Sayed-Ahmed, B. Mirafzal, and N. Demerdash, “Continued operation of delta-connected AC motor-drive systems under short-circuit fault,” in Proc. IEEE International Electric Machines and Drives Conf. (IEMDC), Niagara Falls, Canada, May 2011, pp. 669-674.
23. Hadley (*), B. Mirafzal, and D. Ionel, “On power-sharing of solar-based hybrid motor-drive systems,” in Proc. IEEE Energy Conversion Congress and Exposition Conf. (ECCE), Atlanta, GA Sep. 2010, pp. 695-701.

22. Nejadpak (*), B. Mirafzal, O. Mohammed, and L. Wei, "Effects of different switching algorithms on the thermal behavior of IGBT modules under pulse-load conditions," in Proc. IECON 2010 - 36th Annual Conf. on IEEE Industrial Electronics Society, Phoenix, AZ, Nov. 2010, pp. 451-456.
21. M. Saghaleini (*), B. Mirafzal, and C. Edrington, "Regenerative energy management for pulse-loads in dual DC-AC micro-grids," in Proc. IECON 2010 - 36th Annual Conf. on IEEE Industrial Electronics Society, Phoenix, AZ, Nov. 2010, pp. 674-679.
20. Sarikhani (*), B. Mirafzal, and O. Mohammed, "Inter-turn fault diagnosis of PM synchronous generator for variable speed wind applications using floating space vector," in Proc. IECON 2010 - 36th Annual Conf. on IEEE Industrial Electronics Society, Phoenix, AZ, Nov. 2010, pp. 2628-2633.
19. K. Kaviani (*), B. Mirafzal, and O. Mohammed, "Optimal load coordination in a hybrid bi-axis drive system using genetic algorithm," in Proc. IECON 2010 - 36th Annual Conf. on IEEE Industrial Electronics Society, Phoenix, AZ, Nov. 2010, pp. 939-944.
18. V. S. Pour-Mehr (*), B. Mirafzal, and O. Mohammed, "Pulse-load effects on ship power system stability," in Proc. IECON 2010 - 36th Annual Conf. on IEEE Industrial Electronics Society, Phoenix, AZ, Nov. 2010, pp. 3353-3358.
17. M. M. Amin (*), B. Mirafzal, and O. Mohammed, "A DC-bus voltage regulation for parallel wind-based synchronous generators," in Proc. IECON 2010 - 36th Annual Conf. on IEEE Industrial Electronics Society, Phoenix, AZ, Nov. 2010, pp. 3161-3166.
16. Mirafzal, G. Skibinski, and R. Tallam, "A failure mode for PWM inverter-fed AC motors due to the anti-resonance phenomenon," in Proc. IEEE Industry Applications Society Conf. (IAS Annual Meeting), Edmonton, Canada, Oct. 2008.
15. M. Gries, and B. Mirafzal, "Permanent magnet motor-drive frequency response characteristics for transient phenomena and conducted EMI analysis," in Proc. IEEE Applied Power Electronics Conf. (APEC), Austin, TX, February 2008, pp. 1767-1775.
14. Mirafzal, G. Skibinski, and R. Tallam, "Determination of parameters in the universal induction motor model," in Proc. IEEE Industry Applications Society Conf. (IAS Annual Meeting), New Orleans, LA, Oct. 2007, pp.1207 - 1216.
13. Mirafzal, G. Skibinski, R. Tallam, D. Schlegel, and R. Lukaszewski, "Universal induction motor model with low-to-high frequency response characteristics," in Proc. IEEE Industry Applications Society Conf. (IAS Annual Meeting), Tampa, FL, vol.1, Oct. 2006, pp. 423-433.
12. Sayed-Ahmed, C. Yeh, B. Mirafzal, and N. Demerdash, "Analysis of stator winding inter-turn short-circuit faults in poly-phase induction machines for identification of the faulty phase and estimation of the fault severity," in Proc. IEEE Industry Applications Society Conf. (IAS Annual Meeting), Tampa, FL, vol.3, Oct. 2006, pp. 1519-1524.
11. J. Xu, X. Feng, B. Mirafzal, and N. Demerdash, "Application of optimal fuzzy PID controller design: PI control for nonlinear induction motor," in Proc. The Sixth World Congress on Intelligent Control and Automation Conf., China, June 2006, pp. 3953-3957.
10. Mirafzal, and N. Demerdash, "On innovative methods of induction motor inter-turn and broken-bar fault diagnostics," in Proc. IEEE International Electric Machines and Drives Conf. (IEMDC), San Antonio, TX, May 2005, pp.762-769. (Invited paper)
9. Yeh, B. Mirafzal, R. Povinelli, and N. Demerdash, "A Condition monitoring vector database approach for broken bar fault diagnostics of induction machines," in Proc. IEEE International Electric Machines and Drives Conf. (IEMDC), San Antonio, TX, May 2005, pp.29-34.
8. Mirafzal, F. Fateh, C. Yeh, R. Povinelli, and N. Demerdash, "Condition monitoring of squirrel-cage induction motors fed by PWM -based drives using a parameter estimation approach," in Proc. International Conf. on Power System Technology, Singapore, vol.2, November 2004, pp.1579-1584.
7. Yeh, R. Povinelli, B. Mirafzal, and Nabeel A.O. Demerdash, "Diagnosis of stator winding inter-turn shorts in induction motors fed by PWM-inverter drive systems using a time-series data

mining technique," in Proc. International Conf. on Power System Technology, Singapore, vol.1, November 2004, pp.891-896.

6. Mirafzal, and N. Demerdash, "Effects of load on diagnosing broken bar faults in induction motors using the pendulous oscillation of the rotor magnetic field orientation," in Proc. IEEE Industry Applications Society Conf. (IAS Annual Meeting), Seattle, WA, vol.2, Oct. 2004, pp.699-707.
5. M. Solveson, B. Mirafzal, and N. Demerdash, "Soft started induction motor modeling and heating issues for different starting profiles using a flux linkage ABC-frame of reference," in Proc. IEEE Industry Applications Society Conf. (IAS Annual Meeting), Seattle, WA, vol.1, October 2004, pp.18-25.
4. Mirafzal, and N. Demerdash, "Induction machine fault diagnosis using the rotor magnetic field space vector orientation," in Proc. IEEE Industry Applications Society Conf. (IAS Annual Meeting), Salt Lake City, UT, vol.3, October 2003, pp.1847-1854.
3. Mirafzal, and N. Demerdash, "Effects of inductance nonlinearities in a transformer-rectifier DC motor drive system on the AC side harmonic distortion using a time-stepping coupled finite element-circuit technique," in Proc. IEEE International Electric Machines and Drives Conf. (IEMDC), Madison, WI, vol.3, June 2003, pp.1755-1759.
2. Mirafzal, and N. Demerdash, "A nonlinear controller for current source inverter induction motor drive systems," in Proc. IEEE International Electric Machines and Drives Conf. (IEMDC), Madison, WI, vol.3, June 2003, pp.1491-1497.
1. G. Radman, and B. Mirafzal, "Improvement of transient stability using a thyristor-controlled series compensator," in Proc. 31st Southeastern Symposium on System Theory, SSST'99 Alabama, March 1999, pp. 219-221.

New Graduate Courses

- Motor Drive Systems, Mirafzal, Spring 2021, KSU
- System Identification Techniques, Fateh and Mirafzal, Spring 2019, KSU
- Power Electronics for Renewable Energy Systems, Mirafzal, Spring 2013, KSU
- Elements of Renewable Energy Conversion Systems, Mirafzal, Spring 2010, FIU
- EMI Emission in Power Converters, Mirafzal, Spring 2007, MU

Courses Taught [(*) denotes graduate level]:

- Advanced Power Electronics (*): Spring 2012 - 2024 KSU
- Power Electronics: Fall 2011 - 2023 KSU
- Energy Conversion Systems: Spring and Fall 2018, 2019 KSU
- Power Laboratory, Spring 2015 - 2024 KSU
- Circuit Theory (II): Fall 2012, 2013, 2014, KSU
- Industrial Electronics (*): Fall 2010, FIU
- Power Systems (II): Spring 2009, Fall 2009, Summer 2010, and Spring 2011, FIU
- Power Systems (III): Fall 2008, and 2010, FIU
- Energy Conversion Systems: Spring 2008, UWM
- Power Electronics: Spring 2005 and 2007, MU
- Power Systems: Spring 2006, MU
- Electric Circuits and Machinery: Fall 2006 and 2007, MU

Laboratory Development:

- Modern Power Laboratory for undergraduate students, Mirafzal, Spring 2016, KSU

- Power Electronics Research Laboratory (supported by several grants including an NSF MRI development), Mirafzal, 2012, KSU

Thesis and Dissertation of Advisees:

- Eduard Plett, Ph.D. Dissertation, "Optimization and Design of Hybrid Power Systems with the Daily Energy Balance Method," Defended Nov 2024.
  Remarks: After his graduation, he continued his job at Kansas State University as a faculty member of the Salina campus.
- Mehmetcan Gursoy, Ph.D. Dissertation, "Autonomous Grid-Forming Inverters in Microgrids," Defended April 2024.
  Remarks: After his graduation, he became a lead engineer at GE Aerospace, OH.
- Tareq Hossen, Ph.D. Dissertation, "A Reference-Model Strategy for Self-Protective Smart Inverters," Defended Aug. 2023.
  Remarks: After his graduation, he became a postdoc fellow at the National Renewable Energy Laboratory (NREL), CO.
- Fahmid Sadeque, Ph.D. Dissertation, "Restoration and Universal Operation of Grid-Forming Inverters," Defended Aug. 2022.
  Remarks: After his graduation, he became a postdoc fellow in my group, and now serves as a scientist at Pacific Northweat National Laboratory (PNNL), WA.
- Mohsen S. Pilehvar, Ph.D. Dissertation, "Smart inverters for seamless voltage and frequency dynamics in microgrids," Defended Jan. 2021.
  Remarks: After his graduation, he became a postdoc fellow at Georgia Institute of Technology, GA.
- Joseph Benzaquen, Ph.D. Dissertation, "Smart Three-Phase Power Converter for More Electric Powertrains" KSU, Aug. 2020.
  Remarks: He is the recipient of an IEEE APEC 2018, Outstanding Presentation Award. After his graduation, he became a postdoc fellow and now is a **research faculty** at Georgia Institute of Technology, GA.

- Peter Bontorno, M.S. Thesis, "Applications of Resistive Droop Control to Grid-Connected Low-Voltage Single-Phase Distributed Generators in Microgrids" KSU, Aug. 2020.
  Remarks: He is working at Naval Nuclear Power, NY.

- Aswad Adib, Ph.D. Dissertation, "Control and Stability Enhancement of Grid-Interactive Voltage Source Inverters under Grid Abnormalities" KSU, Dec. 2018.
  Remarks: He is a scientist at Oak Ridge National Laboratory (ORNL), TN.

- Jacob Lamb, Ph.D. Dissertation, "Corrective Switching Algorithms for Internal and External Abnormalities in Cascaded Multilevel Inverters," KSU, Aug. 2017.
  Remarks: He is the recipient of the 2017 Research Award from ECE Department. He is a senior development engineer at the R&D group of Rockwell Automation, WI.

- Chintan Raval, M.S. Thesis, "SiC-Based Unity Power Factor Three-Phase AC-DC Power Supply," KSU, May 2017.
  Remarks: He is a senior engineer at American Electric Power (AEP), OH.

- Akanksha Singh, Ph.D. Dissertation, "Novel Boost Current Source Inverter Topology for Direct-Drive Wind Turbines," KSU, Jan./May 2017.
  Remarks: She is the recipient of the two 2016 Research Award from ECE Department. She is a research engineer at National Renewable Energy Laboratory (NREL), CO.

- Faleh Alskran, M.S. Thesis, "Dynamic Modeling and Analysis of the Three-phase Voltage Source Inverter under Stand-Alone and Grid-Tied Modes," KSU, Aug. 2014.
  Remarks: He became a Ph.D. student at Colorado School of Mines, CO.

- Alireza A. Milani, M.S. Thesis, "Voltage Regulation in a Single-Stage Three-Phase Boost-Inverter using Modified Phasor Pulse Width Modulation Method for Stand-Alone Applications," KSU, Aug. 2013.
  Remarks: See refereed conference papers No. 24 and 25 in Publications List. He became a Ph.D. student, Ph.D. from North Carolina State University, NC.
- Ali K. Kaviani, Ph.D. Dissertation, "Dynamic Modeling and Analysis of Single-Stage Boost Inverters under Normal and Abnormal Conditions," FIU, Aug. 2012.
  Remarks: He is the recipient of a 2011 Fellowship Dissertation Award from FIU. He is a senior development engineer at Eaton Corp., OR.
- Brain Hadley, M.S. Thesis, "Hybrid Motor Drives: Characterization and Control," FIU, Aug. 2011.
  Remarks: He is a senior staff at Bloom Energy, DE.

Postdoctoral Fellows and Visiting Scholars:

- Dr. Fahmid Sadeque, Sep 2022 – Dec 2023
  - Working on grid-forming inverters supported by the DoE and College of Engineering
- Dr. Dushyant Sharma, Jan 2021 – Nov 2021
  - Developed the controller-sync method for grid-forming inverters supported by the DoE
- Dr. Aswad Adib, Jan 2019 – Dec 2019
  - Worked on grid-following inverters supported by the NSF and ECE Department
- Dr. Oben Dağ, Jan 2015 – Aug 2016
  - Worked on the stability of low-inertia systems supported by the Turkish Gov

Current Ph.D. Students:

- Milad Sadoughi, Ph.D. Student, Expected Aug 2026
- Arya Sadasivan, Ph.D. Student, Expected Dec 2026
- Yasin Abdolahi Ph.D. Student, Expected Dec 2029

Editorial Activities:

- Associate Editor, IEEE Transactions on Power Electronics, 2018-present
- Associate Editor, IEEE Transactions on Industry Applications, 2011-2021
  - IEEE-IAS Power Systems Engineering Committee, 2020-2022
  - IEEE-IAS Renewable and Energy Conversion Systems Committee, 2011-2019
- Vice Chair, IEEE IAS Renewable and Sustainable Energy Conv. Sys. Committee, Jan 2024 -
- Secretary, IEEE IAS Renewable and Sustainable Energy Conv. Sys. Committee, Jan 2022- 2023
- Advisor and Counselor, KPEC and SB IEEE IAS Chapter, USA, 2019-present

Special Issue Guest Editorial Activities:

- *Guest Editor*: For a Special Issue in the *Journal of Emerging and Selected Topics in Power Electronics* on **Advanced Technologies of Motor Drives for Zero-Emission E-Mobility** 2023-2024
- *Guest Editor*: For a Special Issue in the IEEE Transactions on Industrial Electronics on **Resilient and Compact Powertrains for On-the-Move Electrical Energy Technologies**, 2019-2020
- *Guest Editor*: For a Special Issue in the IET Renewable Power Generation on **Challenges in Future Grid-Interactive Power Converters: Control Strategies, Optimal Operation, and Corrective Actions**, 2018-2019

Invited Talks and Tutorials:

- University of South Clorina, Columbia, 2024
- Special Session, IEEE ECCE, Nashville, 2023
- Tutorial, IEEE Electric Ship Technologies Symposium, Washington DC, 2023
- Special Session, IEEE ECCE, Detroit, 2022
- Swiss Federal Institute of Technology (ETH), Zurich, 2022
- West Virginia University, WV, 2021
- Sharif University of Technology, (Virtual) 2021
- Louisiana State University, LA, 2020
- SUNY, The State University of New York, Stony Brook, NY, 2019
- Tutorial, IEEE IEMDC, San Diego, CA, 2019
- Tutorial, IEEE IAS 53rd Annual Meeting, Portland, OR, 2018
- Garmin, Kansas City, 2018
- Aalborg University, Denmark 2017
- Missouri University of Science & Technology, Rolla, MO, 2013
- Washington State University, Pullman, WA, 2011
- Oregon State University, Corvallis, OR, 2011
- Rockwell Automation, Mequon, WI, 2010
- A.O. Smith Corporation, Milwaukee, WI, 2010
- IEEE IEMDC, San Antonio, TX, May 2005

Reviewer for Funding Agencies:

- National Science Foundation (NSF), ERC Site Visitor
- National Science Foundation (NSF), USA (ECCS, MRI, ERC, SBIR Programs)
- Department of Energy (DOE), ARPA-E, DOE (SBIR Programs) USA
- University of Arkansas, ECE Graduate Program
- Louisiana Board of Regents
- University of Missouri Research Board
- Oregon-Washington University Transportation Center

Tenure and Promotion External Evaluator:

- University of New Orleans, ECE, 2020
- University of Massachusetts Lowell, ECE, 2022
- University of Nevada, Reno, ECE, 2022

Other Professional Activities:

- Technical Program Vice-Chair, IEEE ECCE, 2022, 2024, 2025
- Senior Editor IAS Annual Meeting Conference, 2025
- Member of the SDEMPED Organizing Committee, Dallas, TX, 2021
- Technical Co-Chair, IEEE IEMDC, Miami, Florida, 2009
- Technical Co-Chair, NAPS, Manhattan, Kansas, 2013
- Member of the Advisory Committee of the IEEE IEMDC, 2015

- Regional Coordinator, IEEE IES US, 2013-2015
- Member, IEEE SDEMPED 2013 Prize Paper Award Committee, 2013
- Secretary, IEEE PES Motor Sub-Committee, 2011-2013
- Track Chair: IEEE ECCE, 2017, Ohio
- Topic Chair and Session Chair: IEEE ECCE, Arizona, 2011, North Carolina, 2012, Denver, 2013 Pittsburg, 2014, Montreal 2015, Milwaukee 2016, Portland 2018, and Detriot 2022
- Session Organizer: IEEE IAS Annual Meeting, 2007, and 2008
- Technical Reviewer:

  IET Renewable Power Generation 2018 – present

  IEEE Transactions on Sustainable Energy, 2011- present

  IEEE Transactions on Industrial Electronics, 2011- present

  IEEE Transactions on Power Electronics, 2008- present

  IEEE Transactions on Energy Conversion, 2005- present

  IEEE Transactions on Industry Applications, 2003- present

Kansas State University Committee/Service Activities:

- Director, ECE Graduate Program Director, 2022 – present
- Member, KSU Graduate School Council, 2022 - present
- Member, KSU COE Research Award Committee, 2020, 2021
- Member, KSU Faculty Senate, 2017- 2020
- Member, KSU COE Dean 5-Years Review Committee, 2018
- Member, KSU Campus Sustainability Committee, 2017-2018
- Member, KSU ECE Department Head 5-Years Review Committee, 2016
- Chair, ECE Faculty Search Committee, 2016-2017
- Member, ECE Faculty Search Committee, 2015-2016
- Member, ECE Course and Curriculum Committee, 2013-2015
- Member, ECE Faculty Search Committee, 2012-2013
- Member, ECE Laboratory Equipment Committee, 2012-2013