YILMAZ SOZER
Professor
Electrical & Computer Engineering
The University of Akron
Auburn Science and Engineering Center West 577 Akron, OH 44325-3904
Phone: (330) 972 7629 Email: ys@uakron.edu

FIELD OF INTERESTS

The analysis, design and control of rotating machinery, power electronics, and energy systems.

EDUCATION

Middle East Technical University	Ankara, Turkey	**Electrical and Electronics Engineering**	BS	1993
Rensselaer Polytechnic Institute	Troy, NY	**Electric Power Engineering**	MS	1995
Rensselaer Polytechnic Institute	Troy, NY	**Electric Power Engineering**	PhD	2000

EMPLOYMENT

- August 2017 - **Professor**
  Electrical & Computer Engineering, University of Akron, Akron, OH
- May 2014 - August 2017 **Associate Professor**
  Electrical & Computer Engineering, University of Akron, Akron, OH
- August 2009- May 2014 **Assistant Professor**
  Electrical & Computer Engineering, University of Akron, Akron, OH
- September 2007- May 2009 **Adjunct Professor**
  Graduate School of Union College, Schenectady, NY
- January 2000- July 2009 **Senior Research Engineer**
  Advanced Energy Conversion LLC, Schenectady, NY
- May 1995, December 1999 **Research Assistant**
  Rensselaer Polytechnic Institute, Troy NY
- May 1992, September 1992 **Summer Intern**
  National Telecom Inc. Izmir, Turkey

TEACHING EXPERIENCE

The University of Akron

- Undergraduate level
  - ❖ Teaching Energy Conversion, Electric Motor Drives, Electric Hybrid Vehicles, and Modern Power Systems courses, Energy Conversion Laboratory, Digital Logic Design Laboratory,
- Graduate level
  - ❖ Teaching Control of Electric Machines, Design of Electric Hybrid Vehicles, and Dynamics of Electric Machines courses
  - ❖ Developing and teaching Modeling and Control of Renewable Energy Systems course

Graduate College of Union University

- Developing curriculum for energy conversion concentration
- Developing and teaching digital control systems course

PROJECTS INVOLVED

- **Rensselaer Polytechnic Institute, 1994 – 1999**

Adaptive Control of Permanent Magnet Motors (Lockheed Martin)
Two types of permanent magnet (PM) motors are studied: the permanent magnet brushless dc motor (PMBDCM) and the permanent magnet synchronous (PMSM) motor. Three types of adaptive controller are applied including direct and indirect techniques. Direct model reference adaptive controller is compared against indirect adaptive techniques and a non-adaptive PI controller. The new control strategies to reduce torque ripple in PMSM and PMBDCM are presented. The developed control algorithms are successfully implemented on the SABER and Matlab simulators. Experimental verification is performed on a DSP-based 30 hp commercial PMSM drive system.

- **Advanced Energy Conversion, 2000 –2009**

Belt Driven Starter Alternator Systems (Dana Corporation)
Two starter/alternator systems (SA) have been developed. The first system was intended to serve as an integrated starter/alternator for a hybrid vehicle. During starting the integrated SA could provide 300 Nm of torque up to a speed of 250 rpm. Second starter/alternator system was designed to be a belt-driven re-starter/alternator unit that would only provide sufficient torque for starting the engine when warm. Following topics were investigated throughout the development of starter/alternator systems.

High Performance Motor Drives (Bechtel Marine Propulsion)
Development and implementation of the predictive space vector current regulation algorithm is achieved for high performance Permanent magnet synchronous motor drives using FPGA based controller. High power multilevel inverter has been designed for Brushless DC Motor Drive. Closed loop voltage balancing technique for diode clamp multilevel inverter with fast space vector PWM algorithms have been developed.

Power Conditioning System for interfacing DC Energy Storage to Electric Utility System
(American Electric Power - U.S. Department of Energy)
The objective of the work was to develop a robust and inexpensive power conditioning system that will interface a large sodium sulfur battery bank to the utility. The system processes power in both directions to support battery charging and delivering battery energy to the utility system. The development activity has been directed at multi-level converters at the 100 kW power level, with the expectation that the technology can be scaled up to significantly higher power levels.

Inverter/Charger System for Residential and Commercial Back up Power
(New York State Energy Research and Development Authority (NYSERDA))
5 kW inverter/charger system capable of supporting power flow in either delivering power to the ac loads (including the utility), or drawing power from an ac source to charge batteries has been developed during the project. Energy storage system is capable of supporting peak load management, critical loads, and renewable energy sources. Inverter efficiency is optimized through using interface transformers.

2.5 kW Inverter for Solar Photovoltaic ((NYSERDA) and U.S. Department of Energy)
Solar PV inverter have been developed which has the ability to operate both in grid connected and stand alone operation. This ability allows this inverter to continue feeding critical loads even during utility outages. Maximum Power Point Tracking Algorithm, Anti-Islanding Control

Algorithm, meeting UL 1741 standards, zero voltage switched high frequency inverter operation, and embedded control have been explored in detail during this research and development project.

Electric Hydrostatic Steering Assist Module (EHSAM) (Dana Corporation)
Switched reluctance and brushless dc motor drives developed as a part of electric hydrostatic steering assist module. Overall system has been characterized and servo controller has been developed to achieve smooth EHSAM operation.

High Power Density Motor/Propulsor (NAVY-SBIR)
Design tool have been developed using Matlab software. Double sided Brushless DC and Switched Reluctance Motors (SRM) and associated inverter drives have been designed for comparison.

Adaptive Control of Interior Permanent Magnet Motor Based Electric Assist Drive System (General Motors)
Interior Permanent Magnet Motor (IPM) has been characterized for Electric Assist Drive System (EADS). Predictive space vector current regulation algorithm for IPM control have been developed and implemented for EADS operation.

Brushless DC Based Military Tactic Starter/Generator Drive (Dewey Electronics)
2.5 kW starter/generator drive system has been developed to charge 42 V batteries. EMI characterization of the system has been developed and filters have been designed to meet Military EMC Standards.

Mutually Coupled Switched Reluctance (MCSR) Based 50 Hp wind turbine Generator (New York State Energy Research and Development Authority (NYSERDA))
Mutually coupled switched reluctance based wind turbine generator has been developed. The MCSRG is capable of operating through standard six switched H-bridge inverter. The system is interface to the utility through back to back inverter. The research has been extended to operate the generator at the extended speed operation.

Utility Interactive Wind Simulator (Rensselaer Polytechnic Institute and New York State Energy Research and Development Authority (NYSERDA))
Model of the 10 kW commercial wind turbine has been developed and emulated through Permanent Magnet Synchronous Motor Drive (PMSM). PMSM is coupled to PM generator and utility interactive **i**nverter to implement Maximum power point operation.

Fly Wheel Energy Storage for Cooling System (Wright-Patterson Air Force Base)
800 W starter/alternator system has been developed using brushless dc machine. Outer rotor designed enables us to implement fly wheel based energy storage.

Bi-directional DC-DC Converter for Hybrid Electric Vehicles (Espey Electronics)
20 kW Bi-directional, isolated, high frequency, three phase interleaved DC-DC converter has been developed for large to input to output voltage ratios. Zero voltage switching operation is achieved for high efficiency operation.

Brushless DC Motor Drive for Valve Actuator (Flo-Tork)
Brushless Dc based servo drive has been developed for valve actuator.

- **UNIVERSITY OF AKRON, 2009-**

RESEARCH GRANTS FUNDED

1. **Project/ Proposal Title:** Design, procure, build, and test a prototype Integrated Starter Generator (ISG) Switched Reluctance Motor for research and development use which uses no rare earth materials.
   Personnel: Yilmaz Sozer
   Funding Agency: US Army Tank-Automotive Research, Development, & Engineering Command (TARDEC) **/** DCS Corp.
   Total Amount of Award: $654,749 (2015-2018)

2. **Project/ Proposal Title:** Smart Sensors and Sensor System Design, Development, and Commercialization.
   (Project 1: Smart Sensor Platform for the Electric Utility Industry Infrastructure, Project 2: Air Stream Mechatronics Unit for Energy Efficient HVAC Systems)
   Personnel: Alexis De Abreu Garcia, Yilmaz Sozer, Nathan Ida,
   Funding Agency: Ohio State Development Department
   Total Amount of Award: $1,744,192 - (Sozer's share is $479,652) (2015-2019)

3. **Project/ Proposal Title:** SiC Based Power Electronic Motor Driver for Class-8 Mild Hybrid Truck
   Personnel: Yilmaz Sozer
   Funding Agency: Department of Energy / Power America
   Total Amount of Award: $243,097 (2017-2019)

4. **Project/ Proposal Title:** SiC Based Power Electronic Motor Driver for Gen-II Front End Motor Generator
   Personnel: Yilmaz Sozer
   Funding Agency: Bendix Commercial Vehicle Systems
   Total Amount of Award: $274,276 (2019-2020)

5. **Project/ Proposal Title:** Collaborative Research: Direct-Drive Modular Transverse Flux Electric Machine without Using Rare-Earth Permanent Magnet Material.
   Personnel: Yilmaz Sozer, Dane Quinn
   Funding Agency: National Science Foundation
   Total Amount of Award: $203,473 (2013-2017)

6. **Project/ Proposal Title:** Detecting and Mitigating Low-Level DC Leakage and Fault Currents in Transit Systems
   Personnel: Yilmaz Sozer
   Funding Agency: National Academy of Sciences Transit Cooperative Research Program
   Total Amount of Award: $250,000 (2015-2016)

7. **Project/ Proposal Title:** Analysis and Design Solutions for Noise Vibration and Harshness in 12-slot/10-pole PMSM used in Electric Power Steering System
   Personnel: Yilmaz Sozer
   Funding Agency: Nexteer Automotive
   Total Amount of Award: $99,237 (2017-2018)

8. **Project/ Proposal Title:** Development of the High Torque Density Transverse Flux Motor (TFM)

Personnel: Yilmaz Sozer
Funding Agency: Aisin AW (Japan)
Total Amount of Award: $81,078 (2019)

9. **Project/ Proposal Title:** Switched Reluctance Controller Development and Validation
Personnel: Yilmaz Sozer
Funding Agency: Future Motors
Total Amount of Award: $68,649 (2018-2019)

10. **Project/ Proposal Title:** Roadway Kinetic Energy Capture and Conversion
Personnel: Yilmaz Sozer, Ala Abbas
Funding Agency: Ohio department of Transportation/ Ohio University
Total Amount of Award: $15,058 (2018-2019)

11. **Project/ Proposal Title:** Conductor, Cable and Associated Hardware Condition Assessment
Personnel: Yilmaz Sozer, Alex De Abreu
Funding Agency: Exacter Inc.
Total Amount of Award: $118,184 (2015-2017)

12. **Project/ Proposal Title:** Advanced grid infrastructure sensors development
Personnel: Yilmaz Sozer, Alex De Abreu
Funding Agency: Exacter Inc.
Total Amount of Award: $120,000 (2018-2019)

13. **Project/ Proposal Title:** Electric Machine Design for Electrically Driven Compressor
Personnel: Yilmaz Sozer
Funding Agency: Bendix Commercial Vehicle Systems.
Total Amount of Award: $35,813 (2015-2016)

14. **Project/ Proposal Title:** Power Line Carrier Communications and its Alternatives for Commercial Vehicle Applications
Personnel: Yilmaz Sozer
Funding Agency: Bendix Commercial Vehicle Systems.
Total Amount of Award: $75,986 (2014-2017)

15. **Project/ Proposal Title:** Hardware in the Loop Simulator to Assist the Development of the PM Brushless DC Motor Drives.
Personnel: Yilmaz Sozer
Funding Agency: Bendix Commercial Vehicle Systems.
Total Amount of Award: $74,317 (2012-2014)

16. **Project/ Proposal Title:** Advanced Brake System
Personnel: Yilmaz Sozer
Funding Agency: Bendix Commercial Vehicle Systems.
Total Amount of Award: $77,573 (2013-2014)

17. **Project/ Proposal Title:** Analysis, Simulation and Measurement of Losses in Electrical Steel.
Personnel: Yilmaz Sozer, Igor Tsukerman
Funding Agency: ABB
Total Amount of Award: $78,000 (2013-2015)

18. **Project/ Proposal Title:** Hybrid/Turbo Electric Propulsion Systems

Personnel: Joan E. Carletta, Yilmaz Sozer
Funding Agency: Wright State Applied Research Corporation
Total Amount of Award: 261,000 (2016-2019)

19. **Project/ Proposal Title:** Control Architecture for Intelligent Aviation Electric Power Systems
Personnel: Joan E. Carletta, Yilmaz Sozer
Funding Agency: Wright State Applied Research Corporation
Total Amount of Award: 100,000 (2016-2019)

20. **Project/ Proposal Title:** Clean Technology Sensors Support for Ohio Companies to Add Value to their Products and Help Move them to the Market Place at an Accelerated Pace (Development of a switched reluctance motor drive for off-road vehicles)
Personnel: Alexis De Abreu Garcia, Yilmaz Sozer, Tom Hartley, Bob Veillette, Joan Carletta
Funding Agency: State of Ohio (Third Frontier Project)
Total Amount of Award: 1,670,000 (Sozer's share is $557,000) (2011-2015)

21. **Project/ Proposal Title:** Research and Development of Clean Vehicle Technology (150 kW Dynamometer Installation, Design and Development of a Series Hybrid Truck, Microgrid Development at the University of Akron)
Personnel: Iqbal Husain, Dane Quinn, Tom Hartley, Yilmaz Sozer
Funding Agency: US Department of Energy
Total Amount of Award: 1,000,000 (Sozer's share is $250,000) (2010-2012)

22. **Project/ Proposal Title:** Single Phase Induction Motors: Tools for Improving Efficiency.
Personnel: Yilmaz Sozer, Igor Tsukerman
Funding Agency: ABB
Total Amount of Award: $39,000 (2013-2014)

23. **Project/ Proposal Title:** Scalable, Low-Cost, High-Performance Non-Rare Earth PM Motor for Hybrid Vehicles.
Personnel: Yilmaz Sozer, Malik Elbuluk.
Funding Agency: GE Global Research subcontract US Department of Energy
Total Amount of Award: $112,000 (2012-2014)

24. **Project/ Proposal Title:** Smart sensor network for health monitoring of power lines
Personnel: Yilmaz Sozer
Funding Agency: University of Akron Proof of Concept Center
Total Amount of Award: $30,000 + $30K Match from Exacter Inc. (2015)

25. **Project/ Proposal Title:** Glucose sensor development
Personnel: Kye-Shin Lee, Yilmaz Sozer
Funding Agency: I2V Inc
Total Amount of Award: $30,000 (2014-2016)

26. **Project/ Proposal Title:** System Design and Feasibility Testing of Mobile Charging System for Electric Vehicles.
Personnel: Yilmaz Sozer, P. Yi.
Funding Agency: Ohio Transportation Center
Total Amount of Award: $119,650 (2012)

27. **Project/ Proposal Title:** Switched Reluctance Machine and Controller Development for Electric Power Steering

Personnel: Iqbal Husain, Yilmaz Sozer
Funding Agency: Nexteer.
Total Amount of Award: $37,619 (2010-2011)

28. **Project/ Proposal Title:** SRM drive model simulation, controller development, inverter design.
Personnel: Iqbal Husain, Yilmaz Sozer
Funding Agency: Continental Electrical Motor Services Edmonton, AB, Canada
Total Amount of Award: $33,500 (2010-2011)

PUBLICATIONS

67 Journals, 178 peer reviewed conference papers

JOURNAL PUBLICATIONS

1. E. Pazouki, Y. Sozer, and A. De Abreu-Garcia, "A Novel Fault Tolerant Control Method for Interleaved DC-DC Converters under Switch Fault Condition," Accepted for publication in *IEEE Transactions on Industry Applications*-2019.

2. S. Chowdhury, M. Badawy, Y. Sozer, A. De Abreu-Garcia, "Adaptive Droop Control Scheme for a Series Connected Battery Management System," Accepted for publication in *IEEE Transactions on Industry Applications*-2019.

3. T. Husain, A. Elrayyah, Y. Sozer, and I. Husain, "Unified control of switched reluctance motors for wide speed operations," *IEEE Transactions on Industrial Electronics*- vol. 54, no.5, pp. 3401-3411, May, 2019.

4. A. Mathis, D. D. Quinn, M. El-Amin, Y. Sozer, "Mechanical Analysis of Vibrations in a Switched Reluctance Motor Using Experimental, Numerical, and Analytical Methodologies" Accepted for publication in *ASME Journal of Vibration and Acoustics,* 2019 (doi:10.1115/1.4042394).

5. B. Tekgun, Y. Sozer, and I. Tsukerman, P. Upadhyay, and S. Englebretson "Core Loss Estimation in Electric Machines with Flux Controlled Core Loss Tester," Accepted for publication in *IEEE Transactions on Industry Applications*-2019(doi:10.1109/TIA.2018. 2874352).

6. T. Husain, I. Hasan, Y. Sozer, I. Husain, and E. Muljadi, "Mechanical and Thermal Performance of Transverse Flux Machines," *IEEE Transactions on Industry Applications*- Accepted for publication in *IEEE Transactions on Industry Applications*-2019.

7. S. Mahmodicherati, M. Elbuluk, and Y. Sozer, "Direct Power Control of a DFIG Wind Power System with Constant Switching Frequency and Reduced Ripple," *IEEE Transactions on Industry Applications Magazine*- vol. 54, no.2, pp. 23-35, January-February, 2019.

8. T. Husain, I. Hasan, Y. Sozer, I. Husain, and E. Muljadi, "Cogging Torque Minimization in Transverse Flux Machines," *IEEE Transactions on Industry Applications*- vol. 55, no.1, pp. 385-397, January-February, 2019.

9. T. Husain, I. Hasan, Y. Sozer, I. Husain, and E. Muljadi, "A Comprehensive Review of Permanent Magnet Transverse Flux Machines for Direct Drive Applications," Accepted for publication in *IEEE Transactions on Industry Applications Magazine*- 2019.

10. T. Husain, W. Uddin, and Y. Sozer, "Performance comparison of short pitched and fully pitched switched reluctance machines over wide speed operations," *IEEE Transactions on Industry Applications*- vol. 54, no.5, pp. 4278-4287, September-October, 2018.

11. M. Abd Elmutalab, A. Elrayyah, T. Husain, and Y. Sozer, "Extending the speed range of a switched reluctance motor using a fast demagnetizing technique," *IEEE Transactions on Industry Applications*- vol. 54, no.4, pp. 3294-3304, July-August, 2018.

12. T. Husain, I. Hasan, Y. Sozer, I. Husain, and E. Muljadi, "Design Considerations of a Transverse Flux Machine for Direct-Drive Wind Turbine Applications," *IEEE Transactions on Industry Applications*- vol. 54, no.4, pp. 3604-3615, July-August, 2018.

13. T. Husain, I. Hasan, Y. Sozer, I. Husain, and E. Muljadi, "Design of a Modular E-Core Flux Concentrating Transverse Flux Machine," *IEEE Transactions on Industry Applications*- vol. 54, no.3, pp. 2115-2128, May-June, 2018.

14. E. Pazouki, Y. Sozer, and A. De Abreu-Garcia, "Fault diagnosis and fault tolerant operation of non-isolated dc-dc converter," *IEEE Transactions on Industry Applications*- vol. 54, no.1, pp. 310-320, January/February, 2018.

15. M. Unal, F. Cingoz, C. Bagcioglu, Y. Sozer, O. Akkus, "Interrelationships between electrical, mechanical and hydration properties of cortical bone," *Journal of the Mechanical Behavior of Biomedical Materials*, vol. 77, pp. 12-23, January, 2018.

16. Y. Yasa, Y. Sozer, and M. Garip, "Loss analysis of high speed switched reluctance machine with integrated simulation metho*ds," International Journal of Applied Electromagnetics and Mechanics*, vol. 56, no. 3, pp. 479-497, 2018

17. Y. Yasa, Y. Sozer, and M. Garip, "High-speed switched reluctance machine: natural frequency calculation and acoustic noise prediction," *Turkish journal of Electrical Engineering and computer scences(Tubitak)*," vol. 26, pp. 999-1010, January 2018

18. M. O. Badawy, T. Husain, Y. Sozer, A. De Abreu-Garcia, "Integrated Control of an IPM Motor Drive and a Novel Hybrid Energy Storage System for Electric Vehicles," *IEEE Transactions on Industry Applications* vol. 53, no.6, pp. 5810-5819, November/December, 2017.

19. D. Tekgun, W. Uddin, K. S. Lee, and Y. Sozer, "Real Time High Frequency Impedance Monitoring of Human Skin through Magnetic Coupling," *IEEE Sensors Journal*- vol. 17, no.19, pp. 6167-6174, October, 2017.

20. W. Uddin, and Y. Sozer, "Analytical Modeling of Mutually Coupled Switched Reluctance Machines under Saturation Based on Design Geometry," *IEEE Transactions on Industry Applications*, vol. 53, no.5, pp. 4431-4440, September/October, 2017.

21. A. Elrayyah, F. Cingoz, and Y. Sozer, "Smart Loads Management Using Droop-Based Control in Integrated Microgrid Systems" *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 5, no.3 , pp. 1142-1153, September, 2017.

22. T. Husain, Y. Sozer, and I. Husain, "DC Assisted Bipolar Switched Reluctance Machine," *IEEE Transactions on Industry Applications*, vol. 53, no.3, pp. 2098-2109, May/June, 2017.

23. F. Cingoz, A. Elrayyah, and Y. Sozer, "Optimized Settings of Droop Parameters Using Stochastic Load Modeling for Effective DC Microgrids Operation" *IEEE Transactions on Industry Applications*- vol. 53, no.1, pp. 1358-1371, March/April, 2017.

24. M. O. Badawy, Y. Sozer, "Power Flow Management of a Grid Tied PV-Battery System for Charging of Electric Vehicles," *IEEE Transactions on Industry Applications*- vol. 53, no.2, pp. 1347-1357, March/April, 2017.

25. A. Ibrahem, A. Elrayyah, Y. Sozer, and A. De Abreu Garcia, "DC railway system emulator for stray current and touch voltage prediction," *IEEE Transactions on Industry Applications*- vol. 53, no.1, pp. 439-446, January/February, 2017.

26. B. Tekgun, Y. Sozer, and I. Tsukerman "Measurement of Core Losses in Electrical Steel in the Saturation Region under DC Bias Conditions," *IEEE Transactions on Industry Applications*, vol. 53, no.1, pp. 88-96, January/February, 2017.

27. F. Cingoz, A. Elrayyah, and Y. Sozer, "Plug-and-Play Nonlinear Droop Construction Scheme to Optimize Islanded Microgrid Operations" *IEEE Transactions on Power Electronics*, vol. 32, no. 4, pp. 2743-2756, April, 2017.

28. A. Ahmed, Y. Sozer, and M. Hamdan, "Maximum Torque per Ampere Control for Buried Magnet PMSM based on DC Link Power Measurement," *IEEE Transactions on Power Electronics,* vol. 32, no.2, pp. 1299-1311, February, 2017.

29. M. O. Badawy, Y. Sozer, and A. De Abreu Garcia, "A Simultaneous Dual Switch Control Structure for a Cascaded Buck Boost PFC Converter Operating in Discontinuous Capacitor Voltage Mode," *IEEE Transactions on Industrial Electronics*, vol. 63, no. 7, pp. 4198-4210, July, 2016.

30. W. Uddin, T. Husain, Y. Sozer, and I. Husain, "Design of a switched reluctance machine for off-road vehicle applications based on torque-speed curve optimization," *IEEE Transactions on Industry Applications*, vol. 52, no. 3, pp. 2138-2147, May-June, 2016.

31. B. Tekgun, Y. Sozer, and I. Tsukerman, "Modeling and parameter estimation of split-single phase induction motors," *IEEE Transactions on Industry Applications*, vol. 52, no. 2, pp. 1431-1440, March-April, 2016.

32. F. Cingoz, A. Elrayyah, and Y. Sozer, "Optimized Resource Management for PV-Fuel Cell Based Microgrids using Load Characterizations," *IEEE Transactions on Industry Applications*, vol. 52, no. 2, pp. 1723-1735, March-April, 2016.

33. M. Badawy, N. Arafat, A. Ahmed, S. Anwar, Y. Sozer, P. Yi, and A. De Abreu Garcia, "Design and Implementation of a 75 KW Mobile Charging System for Electric Vehicles," *IEEE Transactions on Industry Applications*, vol. 52, no. 2, pp. 369-377, March-April, 2016.

34. T. Husain, A. Elrayyah, Y. Sozer, and I. Husain, "Flux Weakening Control of Switched Reluctance Motors in Rotating Reference Frame," *IEEE Transactions on Industry Applications*, vol. 52, no. 1, pp. 267-277, Jan-Feb, 2016.

35. Y. Sozer, I. Husain, and D. A. Torrey, "Guidance in Selecting Advanced Control Techniques for Switched Reluctance Machine Drives in Emerging Applications," *IEEE Transactions on Industry Applications*, vol. 51, no. 6, pp. 4505 - 4514, Nov-Dec, 2015.

36. E. Ofori, T. Husain, Y. Sozer, and I. Husain, "A pulse injection based sensorless position estimation method for a switched reluctance machine over a wide speed range," *IEEE Transactions on Industry Applications* vol. 51, no. 5, pp. 3867-3876, Sept-Oct, 2015.

37. A. Elrayyah, F. Cingoz, and Y. Sozer, "Construction of Nonlinear Droop Relations to Optimize Islanded Microgrid Operations" *IEEE Transactions on Industry Applications*, vol. 51, no. 4, pp. 3404-3413, July-August, 2015.

38. M. Khan, A. Ahmed, I. Husain, Y. Sozer, and M. Badawy, "Performance Analysis of Bi-directional DC-DC Converters for Electric Vehicles," *IEEE Transactions on Industry Applications* vol. 51, no. 4, pp. 3442-3452, July-August, 2015.

39. S. Anwar, A. Elrayyah, and Y. Sozer, "Efficient Single Phase Harmonics Elimination Method for Microgrids Operation, *IEEE Transactions on Industry Applications* vol. 51, no. 4, pp. 3394-3403, July-August, 2015.

40. F. Cingoz, A. Elrayyah, and Y. Sozer, " Optimized Droop Control Parameters for Effective Load Sharing and Voltage Regulation in DC Microgrids," *Electric Power Components and Systems, Taylor & Francis Group, LLC*, vol. 43, no. 9, pp. 879-889, May, 2015.

41. R. Mikail, I. Husain, M. S. Islam, Y. Sozer, and T. Sebastian, "Four-Quadrant Torque Ripple Minimization of Switched Reluctance Machine Through Current Profiling With Mitigation of Rotor Eccentricity Problem and Sensor Errors," *IEEE Transactions on Industry Applications* Vol. 51, No. 3, pp. 2097-2104, May-June, 2015.

42. M. N. Arafat, A. Elrayyah, and Y. Sozer, "An Effective Smooth Transition Control Strategy Using Droop-Based Synchronization for Parallel Inverters," *IEEE Transactions on Industry Applications* Vol. 51, No. 3, pp. 2443-2454, May-June, 2015.

43. A. Elrayyah, Y. Sozer, and M. E. Elbuluk, "Microgrid-Connected PV-Based Sources: A Novel Autonomous Control Method for Maintaining Maximum Power," *IEEE Industry Applications Magazine,* Vol. 21, No. 2, pp. 19-29, March/April, 2015.

44. A. Elrayyah, Y. Sozer, and M. E. Elbuluk, "Modeling and Control Design of Microgrid-Connected PV-Based Sources," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, Vol. 2, No. 4, pp. 907-919, December 2014.

45. R. Mikail, I. Husain, Y. Sozer, M. S. Islam, and T. Sebastian, "A Fixed Switching Frequency Predictive Current Control Method for Switched Reluctance Machines," *IEEE Transactions on Industry Applications* Vol. 51, No. 3, pp. 3717-3726, November/December, 2014.

46. M. A. Khan, I. Husain, and Y. Sozer, "A Bidirectional DC–DC Converter With Overlapping Input and Output Voltage Ranges and Vehicle to Grid Energy Transfer Capability," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, Vol. 2, No. 3, pp. 507-516, September 2014.

47. A. Elrayyah, Y. Sozer, and M. E. Elbuluk, "A Novel Load-Flow Analysis for Stable and Optimized Microgrid Operation," *IEEE Transactions on Power Delivery*, Vol. 29, No. 3, pp. 1407-1416, August, 2014.

48. Y. Sozer, D. A. Torrey, A. Saha, H. Nguyen, and N. Hawes, "Fast minimum loss space vector pulse-width modulation algorithm for multilevel inverters," *IET Power Electronics*, Vol. 7, No. 6, pp. 1590-1602, June, 2014.

49. A. Elrayyah, K. Namburi, Y. Sozer, and I. Husain, "An Effective Dithering Method for Electro-Magnetic Interference (EMI) Reduction in Single Phase DC/AC Inverters," *IEEE Transactions on Power Electronics,* Vol. 29, No. 6, pp. 2798-2806, June, 2014.

50. A. Pasdar, I. H. Cavdar, and Y. Sozer, "Power Line Impedance Prediction at FCC Band Based on Intelligent Home Appliances Status Detection Algorithm through their Individual Energy and Impedance Signatures," *IEEE Transactions on Power Delivery*, Vol. 29, No. 3, pp. 1407-1416, June, 2014.

51. A. Elrayyah, Y. Sozer, and M. Elbuluk, "A Robust PLL Algorithm for Single-Phase Utility-Interactive Inverters," *IET Power Electronics*, Vol. 7, No. 5, pp. 1064-1072, May, 2014.

52. M. O. Badawy, A. S. Yilmaz. Y. Sozer, and I. Husain, "Parallel Power Processing Topology for Solar PV Applications," *IEEE Transactions on Industry Applications*, Vol. 50, No. 2, March/April, 2014.

53. A. Elrayyah, A. Safayet, Y. Sozer, I. Husain, and M. Elbuluk, "Efficient Harmonic and Phase Estimator for Single Phase Grid-Connected Renewable Energy Systems," *IEEE Transactions on Industry Applications,* Vol. 50, No. 1, January/February, 2014.

54. C. Sikder, I. Husain, and Y. Sozer, "Switched Reluctance Generator Control for Optimal Power Generation with Current Regulation," *IEEE Transactions on Industry Applications,* Vol. 50, No. 1, January/February, 2014.

55. M. Khan, I. Husain, and Y. Sozer, "Integrated Electric Motor Drive and Power Electronics for Bidirectional Power Flow between Electric Vehicle and DC or AC grid," *IEEE Transactions on Power Electronics*, Vol. 28, No. 12, pp. 5774-5783, December, 2013.

56. A. Pasdar, Y. Sozer, and I. Husain, "Detecting and Locating Faulty Nodes in Smart Grids Based on High Frequency Signal Injection," *IEEE Transactions on Smart Grid*, Vol. 4, No.2, pp. 1067-1075, June, 2013.

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PATENTS

ISSUED:

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2. R. Mikail, M. S. Islam, Y. Sozer, I. Husain, "System for reducing torque ripple in an electric motor," The University of Akron, Steering Solutions IP Holding Corporation, Patent No. United States Patent 9236820 January 12, 2016.
3. Y. Sozer et all, "System And Method for Condition Monitoring of Electricity Transmission Structures," University of Akron, Akron, OH, United States Patent No. #10,209,291, February 19, 2019.
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   Patent No: German Patent (Deutsches patent-und Markenamt) DE 10313927 March 27, 2003.
   Patent No: Japanese Patent JP 2003299383 October 17, 2003.
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   Patent No: World Intellectual Property Organization WO 01/59922 A3 March 7, 2002.
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9. D. A. Torrey, Y. Sozer "Closed Loop Control of Excitation Parameters for High Speed Switched-Reluctance Generators," Dana Corporation, Toledo, OH. Patent No. United States Patent 7,071,659 July 4, 2006.

PENDING:

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11. Y. Sozer, "Dc Input Current Ripple Reduction in SRM Drive for High Volumetric Power Density Applications," University of Akron, Akron, OH, International Application No. PCT/US2019/018887.
12. K. Webber, D. Streng, I. Hassan, Y. Sozer, A. J. P. Ortega, K. Klass, M. R. Islam, "Permanent magnet machine stator," University of Akron, Akron, OH, US/International Application No. 16/211,778, December 6, 2018.
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PROVISIONAL:

15. Y. Sozer, "Phase Locked Loop Based Signal Processing Approach for the Health Monitoring of Power Systems through Their RF Emissions," University of Akron, Akron, OH, USPTO: #: 62/882,73, August 8, 2019.
16. Y. Sozer, I. Tsukerman, "Microwire Magnetic Cores for Electric Machinery," University of Akron, Akron, OH, USPTO: #62/757,389, November 8, 2018.

17. Y. Sozer, Y. Yasa, "Acoustic Noise Mitigation in Electric Machines Through Leaf Springs Between the Stator Back Iron and Machine Housing," University of Akron, Akron, OH, USPTO: # 62/744,333, October 11, 2018
18. Y. Sozer, "Double Layer V-Shaped Interior Permanent Magnet Axial Flux Machine," University of Akron, Akron, OH, USPTO: #62/739,911, October 2, 2018.

SEMINARS / WORKSHOPS

1. **Professional Educational Seminar** "Design, Modeling and Control of Electric Machines for Automotive Applications" *IEEE Applied Power Electronics Conference & Expo,* Long Beach, CA, March, 2013.

2. **Educational Seminar** "Fundamentals of Electric and Hybrid Electric Vehicles" *SAE*, June, 2013, 2014, 2015, 2016.

3. **Tutoria**l "Switched Reluctance Machines - Design and Control," *IEEE Energy Conversion Congress & Expo*, Denver, CO, September, 2013.

4. **Keynote Speaker** "Impacts of Smart LED Lighting on Energy Systems: Problems, Opportunities" *International Workshop on Solid State Lighting Technologies and Research 2013: LEDs and OLEDs*, Istanbul, Turkey August, 2013.

DISSERTATION/ THESIS

14 PhD and 20 MS students graduated, currently supervising 11 PhD and 4 MS students

1. Yu Zou	Modeling and control of doubly-fed induction generator wind power system and maximum power point tracking (Co-Adv.)	PhD	Aug., 2012 (Assoc. Prof. Saginaw Valley Univ.)
2. Ali Elrayyah	Modeling and control of microgrid connected PV sources	PhD	Dec., 2013 (Qatar Res. Found.)
3. Nayeem Arafat	Modeling and control of distributed energy systems during transition operation between grid connected and standalone modes	PhD	May, 2014 (AC Propulsion)
4. Amir M. Pasdar	Real-time health monitoring of power networks based on their high frequency behavior	PhD	Dec. 2014 (Co-Ax Tech.)
5. Sam Mahmodicherati	Direct Power Control of Doubly Fed Induction Generators (Co-Adv.)	PhD	Aug., 2016 (Rockwell)
6. Wasi Uddin	Modeling and Control of Fully Pitched Mutually Coupled Switched Reluctance Machines	PhD	Aug., 2016 (Schaeffler Group)
7. Mohamed Badawy	Grid Tied PV/Battery System Architecture and Power Management for Fast Electric Vehicles Charging	PhD	Aug., 2016 (Assist. Prof. San Jose State Univ.)
8. Fatih Cingoz	Effective Power Management For Autonomous operations of Microgrids	PhD	Aug., 2016 (Doosan-USA)

9. Burak Tekgun	Analysis, simulation and measurement of losses in electrical steel used in electric machines	PhD	Dec., 2016 (Assist. Prof. A. Gul Unv.)
10. Tausif Husain	Modeling, design and control of a modular E-Core flux concentrating axial flux machine	PhD	Aug, 2017 Borg Warner
11. Aparna Saha	Control Of Multilevel Converters For Voltage Balancing And Fault-Tolerant Operations	PhD	Dec. 2017 Nexteer
12. Iftekhar Hasan	Modeling and Analysis of High Torque Density Transverse Flux Machines for Direct-Drive Applications	PhD	Dec. 2017 LG Electronics
13. Elham Pazouki	Fault Detection, Identification And Protection Method For Single Stage And Interleaved Boost Converters (Co-Adv.)	PhD	Aug, 2018 (Rockwell)
14. Farzad Ahmadi	A Novel Low Loss And Lightweight Magnetic Cores for Electrical Machinery (Co-Adv.)	PhD	Dec, 2018 (Assist. Prof. Youngstown State Univ.)
15. Sifat M. Chowdhury	Power Management for Battery Connected Energy Systems	PhD	Expected Dec, 2019
16. Salman Harisis	Reliability for Energy Management for Renewable Power Systems	PhD	Expected May, 2020
17. Omer Gundogmus	Design and Control of electric machines for noise and vibration mitigation	PhD	Expected Dec, 2019
18. Lavanya Vadamodala	High Performance electric machine design for heavy duty vehicles	PhD	Expected May, 2020
19. Shuvajit Das	Design optimization of TFM, acoustic noise and mechanical vibration mitigation	PhD	Expected May, 2020
20. Md Tawhid Bin Tarek	Double Layer V-Shaped Interior Permanent Magnet Axial Flux Machine	PhD	Expected May, 2020
21. Mohammad N. Shaheed	Reliability for battery management systems	PhD	Expected May, 2020
22. Ehsanul Haque	Power converters with Wide bandgap devices for motor drives	PhD	Expected Dec, 2021
23. Anik Chowdhury	Design optimization of TFM, AFM	PhD	Expected Dec, 2021
24. Okan Boler	Health monitoring sensors for Power Systems	PhD	Expected Dec, 2021
25. Abdulwahab Bandarkar	Electric machine design (SRM/ AFM) for integrated compressor	PhD	Expected Dec, 2021
26. Sandeep Narla	Modeling and control of switched reluctance machine with four quadrant operations	MS	Dec. 2010 (Solar City)
27. Nayeem Mahmud	Energy capture improvement of a solar system with a multilevel	MS	Aug. 2011 (ZF)

	inverter		
28. Brad Mularcik	Virtual Moving Air Gap For the Speed Range Improvement	MS	Aug. 2012 (Diebold)
29. Sreeshailam Palle	Voltage harmonic control of weak utility grid through distributed energy systems	MS	Aug. 2012 (Chrysler)
30. Krishna Namburi	A novel dithering algorithm to reduce EMI in voltage source inverters	MS	Aug. 2012 (Nexteer)
31. Adeeb Ahmed	Maximum torque per Ampere control for PM Synchronous motor drive system	MS	Aug. 2013 (Ford)
32. Ernest Ofori	A pulse injection based sensorless position estimation method for switched reluctance machines over wide speed ranges	MS	Aug. 2014 (Franklin Electric)
33. Saeed Anwar	Active power compensation of microgrid connected systems	MS	Aug, 2014 (Ten. Tech)
34. Hari Prasad	Range extender development for electric vehicle using engine generator set	MS	Dec., 2014 (Chrysler)
35. Rakesh Mitra	Torque ripple minimization of switched reluctance motors using speed signal based current profiling	MS	May, 2015 (Nexteer)
36. Asif M. Chowdhury	Synthesizing diverse waveforms through high power wide bandwidth SiC based inverter	MS	Aug, 2016 (Hala Mch)
37.Mohamad AbdElmutalab	Extending The Speed Range Of A Switched Reluctance Motor Using A Fast Demagnetizing Technique	MS	Aug, 2016 (Byton)
38. Aida Gorgina	Quasi Z- Source based multilevel inverter for single phase photo voltaic applications (Co-Adv.)	MS	Aug., 2016 (Beckett)
39. Amr Ibrahem	Detecting and Mitigating Low-Level DC Leakage and Fault Currents in Transit Systems	MS	Dec, 2016 (Delphi Automotive)
40. Didem Tekgun	Acoustic Noise And Vibration Reduction On Switched Reluctance Machines Through Hole Placement In Stator/Rotor Laminations	MS	May, 2017 Ab. Gul Univ.
41. Awab Ali	A Hybrid Flyback Led Driver With Utility Grid And Solar Pv Interface	MS	Dec. 2017 Hala Mech.
42. Mohammed Elamin	Acoustic noise mitigation of switched reluctance machines through skewing methods	MS	Dec. 2017 Altair
43. Hassan Abdelgabir	Dynamic Modelling of Nonlinear Droop-Controlled Islanded Microgrids And Optimum Placement Of Renewables	MS	May 2018 Go2power
44. Mehmet A. Gormez	Driving Cycle Optimization Of An	MS	Aug , 2018

	Electric City Bus Network		CWR Univ.
45. Oguzhan Kilic	Split Winding Switched Reluctance Machine Drives For Wide Speed Range Operations	MS	Aug, 2018 TurkPetroleum
46. Rachana Shukthija Dasari	Health monitoring of power systems through EMI emission	MS	Dec, 2018 Ford
47. Ali Topcu	Fault detection and reliability analysis for motor drives with multilevel converters	PhD	Aug, 2019 ZF
48. Samir Chowdhury	MPPT control for wireless charging systems	MS	Expected Dec, 2019
49. Fubin Han	Evaluation of Wind Resources Generated from Vehicle Wake	MS	Expected Dec, 2019

PROFESSIONAL ACTIVITIES

- Technical Program Chair, IEEE Energy Conversion Congress & Expo (ECCE) (2019)
- Technical Program Chair, IEEE International Electric Machines and Drives Conference (2019)
- ECCE Steering Committee Member 2016-
- Associate Editor, IEEE Transaction on Industry Applications Electrical Machine Committee 2010-
- Associate Editor, IEEE Transaction on Power Electronics 2012-2018
- Technical Paper Review Chair, IEEE Transactions on Industry Applications, Sustainable and Renewable Energy Systems Committee 2016-
- Associate Editor for the IEEE Transaction on Transportation Electrification 2015-
- Secretary, IEEE IAS Sustainable and Renewable Energy Systems Committee 2012-2014
- Vice Chair, IEEE IAS Sustainable and Renewable Energy Systems Committee 2014-2016
- Chair, IEEE IAS Sustainable and Renewable Energy Systems Committee 2016-
- Vice Program Chair, IEEE Energy Conversion Congress & Expo (2011, 2014, 2015, 2016, 2018)
- Publication Chair, IEEE Energy Conversion Congress & Expo (2018)
- IEEE Senior Member 2014-
- Session Chair, IEEE ECCE (2011, 2012,2013,2014,2015,2016, 2017,2018)
- Topic Chair, IEEE ECCE (2012-2013)
- Topic Chair, IEEE International Electric Machines and Drives Conf. (2015-2017)
- Session Chair, IEEE IEVC 2012 Conference (2012)
- Associate Editor for IEEE-American Control Conference (2013-2014)
- Member of Selection Committee for IEEE IAS-EMC Committee Paper Award (2011)
- Chair of Selection Committee for IEEE IAS-RES Committee Best Paper Award (2016, 2017, 2018, 2019)
- Member of International Advisory Board: International Hydrogen Energy Cong. & Exhib. (2007)
- Track Chair for International Workshop on Solid State Lighting Technologies and Research 2013
- Reviewer for
- IEEE ECCE, IEEE APEC, IEEE PESC, IEEE Int. Conf. on SET, IEEE IEMDC, IEEE Transactions on IAS, IEEE Transactions on PEL, IEEE Transactions on Smart grid , IEEE Transactions on PEL Letters, IET Power Electronics, IET Transportations, IEEE Transactions Industrial Electronics, IEEE Transactions on Magnetics, IEEE Energy Conversion

SERVICE

- RTP Committee Chair 2017-
- RTP Committee Member 2014-
- Graduate Program Curricular Committee Member 2014-2018
- Search Committee Member for Tenure Track Faculty hiring 2012
- Search Committee Member for NTT faculty hiring 2016
- Senior Design Committee Member 2014-2108
- Area coordinator for Power and Energy 2012-

AWARDS

- Outstanding Researcher Award, by the College of Engineering, University of Akron **-- 2018**

- Scholarship from Ministry of Turkish Education for Graduate Studies in US, as being the top student among nationwide examination. **1993-1995**

- Scholarship to study at Izmir Science High (Boarding) School selected with nationwide examination**.** **1985-1988**