

Mohamed Badawy, PhD

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Summary

An Assistant Professor in the electrical engineering department at San Jose State University (SJSU) with specialization in power electronics. Director of the center of power electronic converters at SJSU. Dr. Badawy research focuses on the development of efficient power electronic converters for advanced electric vehicles and renewable energy systems.

Professional Experience

San Jose State University, Electrical Engineering Department, San Jose, CA.

August 2016 - Present

Assistant Professor and Director of the Center of Power Electronic Converters (CPEC)

Teaching experience

- Semiconductor Power Electronics.
- Automatic Control Theory.
- Advanced Power Electronics.
- Selected Topics in Renewable Energy Systems and Electric Vehicles.

Research experience

- Establishing and directing the CPEC at the electrical engineering department.
- Introducing hardware projects to the power electronic students in the department.
- Advising senior students in graduation projects.
- Working on research topics with graduate students in the power electronics and control systems area.

University of Akron, Electrical Engineering Department, Akron, OH.

September 2010 – August 2016

Graduate assistant

Teaching experience

- *Classroom teaching* – Class teacher assistant for Basic Electrical Engineering, Digital Logic Design, Energy Conversion, and Senior Design courses. Work duties included:
- *Lab instructing* – Lab teacher assistant for Senior Design, Energy Conversion, and Digital Logic Design courses. Work duties included:
- *One-on-One tutoring* – Volunteered one-on-one tutoring for different courses including Circuits, Basic Electrical Engineering and Power Electronics.

Research experience

- Working on the department research projects sponsored by federal grants, and projects sponsored by industrial companies. The research projects are in the areas of: Power Electronics, Renewable Energy Resources, and Electric Vehicles.

Bechtel Corporation, Cairo Egypt

February 2008- September 2010

Procurement engineer (February 2010 – September 2010)

Electrical Engineer, Bechtel Tebbin Power Plant project (February 2008 – February 2010)

Education

PhD in Electrical and Computer Engineering (2012-2016) University of Akron, OH, USA

Dissertation: Grid Tied PV/Battery System Architecture and Power Management for Fast Electric Vehicles Charging.

MSc. in Electrical & Computer Engineering (2010-2012) University of Akron, OH, USA

Thesis: Modeling, Analysis and Experimental Implementation of the Parallel Power Processing Topology for Solar PV Applications.

Bachelor of Electrical Power Engineering (2003-2007) Cairo University, Cairo, Egypt

Awards and Funding

- Department of Energy: “Development of Low-Cost Graduate Course with Virtual Fab and Hands-on Circuit Lab Experience to Prepare Students to Work in the SiC Industry in Silicon Valley” – Awarded amount: \$50,000.00
- Delta Electronics Award: “Development of a Photovoltaic Converter Using a Novel Differential Power Processing Topology” – Awarded Amount: \$59,000.00
- National Science Foundation “MRI: Acquisition of a Power-Hardware-in-the-Loop (PHIL) System to Enhance Research and Student Research Training in Engineering and Computer Science” – Awarded amount: \$ 297,318.00
- San Jose State University Research Professor Award for the project “A Novel Energy Management System of Hybrid Storage Devices for Electric Vehicle Applications” – Awarded amount: \$39,747.00

- San Jose State University Grants Academy award.
- Mineta Transportation institute – “Wireless Power Charging of Electric Vehicles using Resonant Converters” – Awarded amount: \$5,000.00

Professional Services

- Associate Editor for IEEE Industrial Application Transactions.
- Topic Chair for IEEE ECCE Conference.
- Organizing committee member, awarding committee member, review committee member and session chair of IEEE COMPEL conference in Stanford, CA {July 2017}.
- Session chair of IEEE ECCE conference in Milwaukee, WI {Sept. 2016}.
- Technical reviewer for IEEE Transactions on Power Electronics, IEEE Transactions on Ind. Electronics, IEEE Transactions on Industrial Applications and several IEEE conferences.

Selected Publications

- **M.O. Badawy**, T. Husain and Y. Sozer, "Integrated Control of an IPM Motor Drive and a Hybrid Energy Storage System for Electric Vehicles," *IEEE Trans. on Ind. Appl.*, 2017.
- **M. O. Badawy** and Y. Sozer, "Power Flow Management of a Grid Tied PV-Battery System for Electric Vehicles Charging," *IEEE Trans. on Ind. Appl.*, vol. 53, no. 2, pp. 1347-1357, Mar.-Apr. 2017.
- **M.O. Badawy**, Y. Sozer, and J. A. De Abreu-Garcia, "A Novel Control Structure for a Cascaded Buck Boost PFC Converter Operating in Discontinuous Capacitor Voltage Mode." *IEEE Trans. on Ind. Electron.*, vol. 63, no. 7, pp. 4198-4210, July 2016.
- **M.O. Badawy**, M.N. Ararat, A. Ahmed, S. Anwar, Y. Sozer, P. Yi, and J.A. De Abreu-Garcia, "Design and Implementation of a 75 KW Mobile Charging System for Electric Vehicles." *IEEE Trans. on Ind. Appl.*, vol. 52, no. 1, pp. 369-377, Jan.-Feb. 2016.
- M.A. Khan, A. Ahmed, I. Husain, Y. Sozer, and **M.O. Badawy**, "Performance Analysis of Bi-directional DC-DC Converters for Electric Vehicles." *IEEE Trans. on Ind. Appl.*, vol. 51, no. 4, pp. 3442-3452, July-Aug. 2015 .
- **M.O. Badawy**, A.S. Yilmaz, Y. Sozer, and I. Husain "Parallel Power Processing Topology for Solar PV Applications." *IEEE Trans. on Ind. Appl.* 2014, vol. 50, no. 2, pp.1245-1255, Mar.-Apr. 2014.
- Bose, **M.O. Badawy** and Y. Sozer "A Novel Differential Power Processing Architecture for a Partially Shaded PV String Using Distributed Control" In *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, Portland, OR, 2018.
- S. George, and **M.O. Badawy** "Energy Management of Modular Hybrid Storage System for Electric Vehicles" In *Proc. IEEE International Transportation Electrification Conference (ITEC)*, Long Beach, CA, 2018.
- A. Murthy and **M.O. Badawy** "State Space Averaging Model of a Dual Stage Converter in Discontinuous Conduction Mode" In *Proc. IEEE Control and Modeling of Power Electronics (COMPEL)*, Stanford, CA, 2017.
- S. Chowdhury, **M.O. Badawy**, Y. Sozer and J. A. De Abreu-Garcia "A Novel Battery Management System Using a Duality of the Adaptive Droop Control Theory" In *Proc. IEEE Energy Conv. Cong. and Expo. (ECCE)*, Cincinnati, Ohio, 2017.
- **M.O. Badawy**, and Y. Sozer "Differential Power Processing of Photovoltaic Systems for High Energy Capture and Reduced Cost - Configurations and Control Approaches" In *Proc. IEEE Energy Conv. Cong. and Expo. (ECCE)*, Cincinnati, Ohio, 2017.
- A. Murthy, and **M. O. Badawy**, "State Space Averaging Model of a Dual Stage Converter in Discontinuous Conduction Mode" in *Proc. IEEE Control and Modeling for Power Electronics (COMPEL)*, 2017
- **M.O. Badawy**, T. Husain and Y. Sozer, "Integrated control of an IPM motor drive and hybrid energy storage system for electric vehicles," In *Proc. IEEE Energy Conv. Cong. and Expo. (ECCE)*, pp. 1-8, 2016.
- **M.O. Badawy**, F. Cingoz, and Y. Sozer "Battery storage sizing for a grid tied PV system based on operating cost minimization" In *Proc. IEEE Energy Conv. Cong. and Expo. (ECCE)*, pp. 1-7, 2016.
- A. Elrayah, **M. Badawy** and Y. Sozer, "Feeding partial power into line capacitors for low cost and efficient MPPT of photovoltaic strings," in *Proc. IEEE Applied Power Electron. Conf. (APEC)*, pp. 392-397, 2016.
- **M.O. Badawy**, and Y. Sozer "Power Flow Management of a Grid Tied PV-Battery Powered Fast Electric Vehicle Charging Station" In *Proc. IEEE Energy Conv. Cong. and Expo. (ECCE)*, pp. 4959-4966, 20-24 Sept. 2015.
- **M.O. Badawy** et al, "A Partial Power Processing of Battery-Ultra capacitor Hybrid Energy Storage System for Electric Vehicles." In *Proc. IEEE App. Power Electron. Conf. (APEC)*, pp. 3162-3168, 15-19 Mar. 2015.
- S. Anwar, **M.O. Badawy**, and Y. Sozer, "Power Factor Correction of LED Driver with Third Port Energy Storage." In *Proc. IEEE App. Power Electron. Conf. (APEC)*, pp. 2206-2211, 15-19 Mar. 2015.
- F. Cingoz, A. Elrayah, **M.O. Badawy**, and Y. Sozer, "Reliability and cost analysis of solar photovoltaic and fuel cell based microgrids." In *Proc. IEEE App. Power Electron. Conf. (APEC)*, pp. 3166-3173, 16-20 Mar. 2014.
- **M.O. Badawy**, A. Elrayah, F. Cingoz, and Y. Sozer, "Non-Isolated Individual MPPT for Series String Connected PV Panels through Partial Current Processing Techniques." In *Proc. IEEE App. Power Electron. Conf. (APEC)*, pp. 3034-3041, 16-20 Mar. 2014.
- A. Ahmed, M.A. Khan, **M.O. Badawy**, Y. Sozer, and I. Husain, "Performance analysis of bi-directional DC-DC converters for electric vehicles and charging infrastructure." In *Proc. IEEE Energy Conv. Cong. and Expo. (ECCE)*, pp.1401-1408, 15-19 Sept. 2013.
- **M.O. Badawy**, and Y. Sozer "Active THD Reduction Strategy for Grid Connected EV Charging Stations." In *Proc. IEEE Energy Tech.*, pp. 1-5, 21-23 May 2013.

Website Links

- ✓ [Sjsu.edu/people/mohamed.badawy](https://sjsu.edu/people/mohamed.badawy)
- ✓ www.linkedin.com/in/mobadawy