

Curriculum Vitae

Mehdi Ferdowsi, Ph.D.

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EDUCATION:

Ph.D.	Electrical Engineering	<i>Illinois Institute of Technology</i>	2004
M.Sc.	Electrical Engineering	<i>Sharif University of Technology</i>	1999
B.Sc.	Electrical Engineering	<i>University of Tehran</i>	1997

WORK EXPERIENCE:

2010 - present	Associate Professor, Electrical and Computer Engineering Department, Missouri University of Science and Technology
2004 - 2010	Assistant Professor, Electrical and Computer Engineering Department, Missouri University of Science and Technology
2002 - 2004	Ph.D. Research Assistant, Grainger Power Electronics and Motor Drives Laboratory, Illinois Institute of Technology

HONORS, AWARDS, AND RECOGNITIONS:

- Teaching Excellence Recognition, Missouri S&T, 2007-08 and 2011-12 academic years.
- Prize Paper Award, IEEE Vehicle Power & Propulsion Conf. (VPPC), Harbin, China, 2008.
- Faculty Early Career Development (CAREER) Award, National Science Foundation, 2007.
- Outstanding Teaching Award, Missouri S&T, 2005-06 academic year.
- Teaching Excellence Award, School of Engineering, Missouri S&T, November 2006.
- University of Missouri New Faculty Teaching Scholars (NFTS) program, 2006-07.
- Joseph P. Suozzi INTELEC Fellowship Award from the IEEE Power Electronics Society (PELS) Education Committee, 2003.
- Ranked 14th, Nationwide M.Sc. Entrance Exam in Electrical Engineering of Iranian Universities, 1997, out of nearly 15,000 participants.
- Ranked 39th, Nationwide B.Sc. Entrance Exam in Mathematics and Physics of Iranian Universities, 1992, out of nearly 300,000 participants.

¹ formerly University of Missouri - Rolla (UMR)

RESEARCH AND TEACHING INTERESTS:

- Power Electronics and Energy Conversion
- Renewable Energy Sources
- Energy Storage Systems
- Smart Grid Technology
- Electric, Hybrid, and Plug-in Hybrid Vehicles

TEACHING EXPERIENCE:

Instructor of record for the following courses at Missouri S&T

- Circuits I, Sophomore level
- Electromechanics, Junior/Senior level
- Power Electronics, Senior/Graduate level
- Power Electronics Lab., Senior/Graduate level
- Electric-Drive Vehicles, Senior/Graduate level, Developed by Dr. Ferdowsi
- Advanced Electric-Drive Vehicles, Graduate level, Developed by Dr. Ferdowsi
- Advanced Power Electronics, Graduate level, Developed by Dr. Ferdowsi

BOOK CHAPTER:

2. Z. Darabi and M. Ferdowsi, *Impact of Plug-in Hybrid Electric Vehicles on Electricity Demand Profile*, (Book Chapter) in *Smart Power Grids 2011*, Springer-Verlag Berlin Heidelberg, 2011, pp. 319-349.
1. M. Ferdowsi, *Motors*, (Book Chapter) in *Electrical Engineering Handbook*, 3rd Edition - 6th Volume Set, Richard C. Dorf, CRC Press, Boca Raton, FL, Jan. 2006.

PEER-REVIEWED JOURNAL PUBLICATIONS:

- J25 Z. Darabi and M. Ferdowsi, "An Event-based Simulation Framework to Examine the Response of Power Grid to the Charging Demand of Plug-in Hybrid Electric Vehicles (PHEVs)," *IEEE Trans. Industrial Informatics*, Vol. 10, No. 1, pp. 313-322, February 2014.
- J24 H. Sepahvand, M. Khazraei, K. Corzine, and M. Ferdowsi, "Start-up procedure and switching losses reduction for a single-phase flying capacitor active rectifier," *IEEE Trans. Industrial Electronics*, Vol. 60, No. 9, pp. 3699-3710, September 2013.
- J23 H. Sepahvand, Q. Liao, and M. Ferdowsi, "Capacitor Voltage Regulation in Single-dc-source cascaded H-bridge multilevel converters using phase-shift modulation," *IEEE Trans. Industrial Electronics*, Vol. 60, No. 9, pp. 3619-3626, September 2013.
- J22 M. Khazraei and M. Ferdowsi, "Modeling and Analysis of Projected Cross-Point Control—a new current model control approach," *IEEE Trans. Industrial Electronics*, Vol. 60, No. 8, pp. 3272-3282, August 2013.

- J21) L. Shi, B. Baddipadiga, M. Ferdowsi, and M. Crow, "Improving the dynamic response of flying-capacitor three-level buck converter," *IEEE Trans. Power Electronics*, vol. 28, no. 5, pp. 2356-2365, May 2013.
- J20) R. Ahmadi, H. Zargarzadeh, M. Ferdowsi, "Nonlinear controller for power sharing in double-input H-bridge-based converters," *IEEE Trans. Power Electronics*, vol. 28, no. 5, pp. 2402-2414, May 2013.
- J19) M. Khazraei, H. Sepahvand, M. Ferdowsi, and K. Corzine, "Hysteresis-based control of single-phase multilevel flying capacitor active rectifier," *IEEE Trans. Power Electronics*, vol. 28, no. 1, pp. 154-164, January 2013.
- J18) R. Ahmadi and M. Ferdowsi, "Double-input converters based on H-bridge cells: Derivation, small-signal modeling, and power sharing analysis," *IEEE Trans. Circuits and Systems I*, vol. 59, no. 4, pp. 875-888, April 2012.
- J17) M. Khazraei, H. Sepahvand, K. Corzine, and M. Ferdowsi, "Active capacitor voltage balancing in single-phase flying-capacitor multilevel power converters," *IEEE Trans. Industrial Electronics*, vol. 59, no. 2, pp. 669-778, February 2012.
- J16) H. Sepahvand, Q. Liao, and M. Ferdowsi, "Investigation on capacitor voltage regulation in cascaded H-bridge multilevel converters with fundamental frequency switching," *IEEE Trans. Industrial Electronics*, vol. 58, no. 11, pp. 5102-5111, November 2011.
- J15) Z. Darabi and M. Ferdowsi, "Aggregated impact of plug-in hybrid electric vehicles on electricity demand profile," *IEEE Trans. Sustainable Energy*, vol. 2, no. 4, pp. 501-508, October 2011.
- J14) A. Yazdani, H. Sepahvand, M. L. Crow, and M. Ferdowsi, "Fault detection and mitigation in multilevel converter STATCOMs," *IEEE Trans. Industrial Electronics*, vol. 58, no. 4, pp. 1307-1315, April 2011.
- J13) K. P. Yamanchili, M. Ferdowsi, S. Lu, P. Xiao, and K. Corzine, "Derivation of double-input dc-dc power electronic converters," *Electric Power Components and Systems*, vol. 39, no. 3, pp. 478-490, March 2011.
- J12) K. Gummi and M. Ferdowsi, "Double-input dc-dc power electronic converters for electric-drive vehicles—topology exploration and synthesis using a single-pole triple-throw switch," *IEEE Trans. Industrial Electronics*, vol. 57, no. 2, pp. 617-623, February 2010.
- J11) A. Patel and M. Ferdowsi, "Current sensing for automotive electronics—a survey," *IEEE Trans. Vehicular Technology*, vol. 58, no. 3, pp. 4108-4119, October 2009.
- J10) D. Somayajula, A. Meintz, and M. Ferdowsi, "Designing efficient hybrid electric vehicles," *IEEE Vehicular Technology Magazine*, vol. 4, no. 2, pp. 65-72, June 2009.
- J9) A. C. Baughman and M. Ferdowsi, "Double-tiered switched-capacitor battery charge equalization technique" *IEEE Trans. Industrial Electronics*, vol. 55, no. 6, pp. 2277-2285, June 2008.
- J8) S. Lu, K. A. Corzine, and M. Ferdowsi, "A unique ultracapacitor direct integration scheme in multilevel motor drives for large vehicle propulsion," *IEEE Trans. Vehicular Technology*, vol. 56, no. 4, pp. 1506-1515, July 2007.

- J7] S. Lu, K. A. Corzine, and M. Ferdowsi, "A new battery/ultracapacitor energy storage system design and its motor drive integration for hybrid electric vehicles," *IEEE Trans. Vehicular Technology*, vol. 56, no. 4, pp. 1516-1523, July 2007.
- J6] A. C. Baughman and M. Ferdowsi, "Battery charge equalization—state of the art and future trends," *Society of Automotive Engineers (SAE) Transactions, Journal of Passenger Cars: Electronic and Electrical Systems*, vol. 114, no. 7, pp. 905-910, February 2006.
- J5] M. Ferdowsi, A. Emadi, M. P. Telefus, and C. Davis, "Pulse regulation control technique for flyback converter," *IEEE Trans. Power Electronics*, vol. 20, no. 4, pp. 798-805, July 2005.
- J4] M. Ferdowsi and A. Emadi, "Pulse regulation control technique for integrated high-quality rectifiers-regulators," *IEEE Trans. Industrial Electronics*, vol. 52, no. 1, pp. 116-124, February 2005.
- J3] M. Ferdowsi, A. Emadi, M. P. Telefus, and A. Shteynberg, "Suitability of pulse train control technique for BIFRED converter," *IEEE Trans. Aerospace and Electronics Systems*, vol. 41, no. 1, pp. 181-189, January 2005.
- J2] M. P. Telefus, A. Shteynberg, M. Ferdowsi, and A. Emadi, "Pulse train control technique for flyback converter," *IEEE Trans. Power Electronics*, vol. 19, no. 3, pp. 757-764, May 2004.
- J1] M. Ferdowsi and A. Emadi, "Estimative current mode control technique for dc-dc converters operating in discontinuous conduction mode," *IEEE Power Electronics Letters*, vol. 2, no. 1, pp. 20-23, March 2004.

OTHER JOURNAL PUBLICATIONS

1. N. Lotfi, P. Fajri, S. Novosad, J. Savage, R. Landers, and Ferdowsi, "Development of an experimental testbed for research in lithium-ion battery management systems," *MDPI Energies*, pp. 5231-5258, 2013.

REFEREED CONFERENCE PUBLICATIONS:

- C88] R. Ahmadi and M. Ferdowsi, "Improving performance of dc-dc cascaded converter system using an extra feedback loop," in *IEEE Energy Conversion Congress and Exposition (ECCE)*, Denver, CO, Sept. 2013, pp. 5511-5517.
- C87] P. Fajri, R. Ahmadi, and M. Ferdowsi, "Control approach based on equivalent vehicle rotational inertia suitable for motor-dynamometer test bench emulation of electric vehicles," in *Proc. International Electric Machines and Drives Conference*, Chicago, IL, May 2013, pp. 1221-1225.
- C86] P. Elhaminia, J. Yaghoobi, M. Yazdani, M. R. Zolghadri, and M. Ferdowsi, "Comparing different motor structures in superconducting synchronous motors," in *Proc. International Electric Machines and Drives Conference*, Chicago, IL, May 2013, pp. 1119-1123.
- C85] R. Ahmadi, H. Behjati, and M. Ferdowsi, "Dynamic modeling and stability analysis of an experimental test bench for electric-ship propulsion," in *Proc. IEEE Electric Ship Technologies Symposium*, Arlington, VA, Apr. 2013, pp. 110-115.

- C84 R. Ahmadi, P. Fajri, and M. Ferdowsi, "Dynamic modeling and stability analysis of an experimental test bench for electric-drive vehicle emulation," in *Proc. IEEE Power and Energy Conference at Illinois*, Urbana, IL, Feb. 2013, pp. 88-94.
- C83 P. Fajri, R. Ahmadi, and M. Ferdowsi, "Test bench for emulating electric-drive vehicle systems using equivalent vehicle rotational inertia," in *Proc. IEEE Power and Energy Conference at Illinois*, Urbana, IL, Feb. 2013, pp. 83-87.
- C82 O. Ghatpande, K. Corzine, P. Fajri, and M. Ferdowsi, "Multiple reference frame theory for harmonic compensation via doubly fed induction generators," in *Proc. IEEE Power and Energy Conference at Illinois*, Urbana, IL, Feb. 2013, pp. 60-64.
- C81 P. Fajri, R. Ahmadi, and M. Ferdowsi, "Equivalent vehicle rotational inertia used for electric vehicle test bench dynamic studies," in *Proc. 38th IEEE Annual Conference of the Industrial Electronics Society (IECON)*, Montreal, Canada, Oct. 2012, pp. 4115-4120.
- C80 R. Ahmadi, P. Fajri, and M. Ferdowsi, "Performance improvement of a dc-dc converter feeding telecommunication specific distributed power system using dynamic decoupling design," in *Proc. IEEE International Telecommunications Energy Conference (INTELEC)*, Scottsdale, AZ, Sept. 2012, pp. 1-7.
- C79 H. Sepahvand, M. Khazraei, M. Ferdowsi, and K. Corzine, "Capacitor voltage regulation and pre-charge routine for flying capacitor active rectifier," in *IEEE Energy Conversion Congress and Exposition (ECCE)*, Raleigh, NC, Sept. 2012, pp. 4107-4112.
- C78 D. Paschedag and M. Ferdowsi, "Elimination of zero-crossing distortion in a power factor correction circuit," in *IEEE Energy Conversion Congress and Exposition (ECCE)*, Raleigh, NC, Sept. 2012, pp. 4049-4052.
- C77 Z. Darabi and M. Ferdowsi, "Charging rate optimization for plug-in hybrid electric vehicles in smart grid," in *IEEE Energy Conversion Congress and Exposition (ECCE)*, Raleigh, NC, Sept. 2012, pp. 3070-3074.
- C76 Z. Darabi, B. Falahati, M. Mousavi, and M. Ferdowsi, "On circuit breaker failure protection in 1850-based substations," in *IEEE Power and Energy Society General Meeting*, San Diego, CA, July 2012, pp. 1-6.
- C75 Z. Darabi and M. Ferdowsi, "Examining power grid's capacity to meet transportation electrification demand," in *IEEE Power and Energy Society General Meeting*, San Diego, CA, July 2012, pp. 1-7.
- C74 B. Falahati, Y. Fu, Z. Darabi, and M. Ferdowsi, "Generation capacity extension in the power system with large-scale PHEV integration," in *Proc. IEEE PES Transmission and Distribution Conference and Exposition*, Orlando, FL, May 2012, pp. 1-7.
- C73 Z. Darabi and M. Ferdowsi, "Extracting probability distribution functions applicable for PHEVs charging load profile," in *Proc. IEEE PES Transmission and Distribution Conference and Exposition*, Orlando, FL, May 2012, pp. 1-6.
- C72 T. El-mezyani, R. Wilson, J. Leonard, C. Edrington, S. Srivastava, M. Khazraei, H. Qin, J. Kimball, and M. Ferdowsi, "Evaluation of nonlinearity and complexity in SSTs systems," in *IEEE 6th International Systems Conference (SysCon)*, Vancouver, BC, Mar. 2012, pp. 1-7.

- C71 L. Shi, R. Ahmadi, M. Ferdowsi, and M. Crow, "Dynamic response improvement in H-bridge enhanced buck converter," in *Proc. IEEE 27th Applied Power Electronics Conference and Exposition (APEC)*, Orlando, FL, Feb. 2012, pp. 1880-1886.
- C70 R. Ahmadi and M. Ferdowsi, "Controller design method for a cascaded converter system comprised of two dc-dc converters considering the effects of mutual interactions," in *Proc. IEEE 27th Applied Power Electronics Conference and Exposition (APEC)*, Orlando, FL, Feb. 2012, pp. 1838-1844.
- C69 R. Ahmadi, H. Zargarzadeh, and M. Ferdowsi, "Nonlinear power sharing controller for double-input H-bridge based converters," in *Proc. IEEE 27th Applied Power Electronics Conference and Exposition (APEC)*, Orlando, FL, Feb. 2012, pp. 2000-2006.
- C68 R. Ahmadi and M. Ferdowsi, "Canonical small-signal model of double-input converters based on H-bridge cells," in *IEEE Energy Conversion Congress and Exposition (ECCE)*, Phoenix, AZ, Sept. 2011, pp. 3946-3953.
- C67 Z. Darabi and M. Ferdowsi, "Plug-in hybrid electric vehicles: Charging load profile extraction based on transportation data," in *IEEE Power and Energy Society General Meeting*, Detroit, MI, July 2011, pp. 1-8.
- C66 R. Ahmadi, N. Yousefpour, and M. Ferdowsi, "Power sharing analysis of double-input converters based on H-bridge cells," in *Proc. IEEE Electric Ship Technologies Symposium*, Alexandria, VA, Apr. 2011, pp. 111-114.
- C65 H. Sepahvand, M. Ferdowsi, and K. Corzine, "Fault recovery strategy for hybrid cascaded H-bridge multi-level inverters," in *Proc. IEEE 26th Applied Power Electronics Conference and Exposition (APEC)*, Fort Worth, TX, Mar. 2011, pp. 1629-1633.
- C64 R. Ahmadi, D. Paschedag, and M. Ferdowsi, "Analyzing stability issues in a cascaded converter system comprised of two voltage-mode controlled dc-dc converters," in *Proc. IEEE 26th Applied Power Electronics Conference and Exposition (APEC)*, Fort Worth, TX, Mar. 2011, pp. 1769-1775.
- C63 R. Ahmadi, D. Paschedag, and M. Ferdowsi, "Closed-loop input and output impedances of dc-dc switching converters operating in voltage and current mode control," in *Proc. 36th IEEE Annual Conference of the Industrial Electronics Society (IECON)*, Phoenix, AZ, Nov. 2010, pp. 2305-2310.
- C62 H. Sepahvand, M. Ferdowsi, and K. Corzine, "A seven-level converter using a combination of staircase and PWM switching methods," in *Proc. 36th IEEE Annual Conference of the Industrial Electronics Society (IECON)*, Phoenix, AZ, Nov. 2010, pp. 2301-2304.
- C61 L. Shi, M. Ferdowsi, and M. L. Crow, "Dynamic response improvement in a buck type converter using a capacitor current feed-forward control," in *Proc. 36th IEEE Annual Conference of the Industrial Electronics Society (IECON)*, Phoenix, AZ, Nov. 2010, pp. 439-444.
- C60 N. Noroozi, M. R. Zolghadri, and M. Ferdowsi, "A soft switching three-phase three-switch buck rectifier," in *Proc. 36th IEEE Annual Conference of the Industrial Electronics Society (IECON)*, Phoenix, AZ, Nov. 2010, pp. 315-320.

- C59 L. Shi, M. Ferdowsi, and M. Crow, "Dynamic response improvement in a three-level Buck type converter," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, Atlanta, GA, Sept. 2010, pp. 1952-1958.
- C58 M. Khazraei, H. Sepahvand, and M. Ferdowsi, "Power factor correction using Projected Cross Point Control (PCPC)," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, Atlanta, GA, Sept. 2010, pp. 2055-2059.
- C57 Y. Karimi, V. Nasirian, M. Ahmadian, P. Yaghoobi, M. Zolghadri, and M. Ferdowsi, "Small-signal model development for a Cúk converter while operating in DCM for both dc and ac input voltages," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, Atlanta, GA, Sept. 2010, pp. 2613-2619.
- C56 H. Sepahvand, M. Khazraei, M. Ferdowsi, and K. Corzine, "A hybrid multilevel inverter with both staircase and PWM switching schemes," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, Atlanta, GA, Sept. 2010, pp. 4364-4367.
- C55 A. Mohammadpour, M. Zolghadri, and M. Ferdowsi, "Constant input power control of a three-phase isolated Buck+Boost rectifier," in *Proc. IEEE International Telecommunications Energy Conference (INTELEC)*, Orlando, FL, USA, June 2010.
- C54 D. Somayajula and M. Ferdowsi, "Small-signal modeling and analysis of the double-input buckboost converter," in *Proc. IEEE 25th Applied Power Electronics Conference and Exposition (APEC)*, Palm Springs, CA, Feb. 2010, pp. 2111-2115.
- C53 H. Sepahvand, M. Khazraei, M. Ferdowsi, and K. Corzine, "Feasibility of capacitor voltage regulation and output voltage harmonic minimization in cascaded H-bridge converters," in *Proc. IEEE 25th Applied Power Electronics Conference and Exposition (APEC)*, Palm Springs, CA, Feb. 2010, pp. 452-457.
- C52 M. Khazraei, H. Sepahvand, K. Corzine, and M. Ferdowsi, "A generalized capacitor voltage balancing scheme for flying capacitor multilevel converters," in *Proc. IEEE 25th Applied Power Electronics Conference and Exposition (APEC)*, Palm Springs, CA, Feb. 2010, pp. 58-62.
- C51 J. A. Ashaku, A. L. Meintz, R. G. Landers, and M. Ferdowsi, "Development of processor, software, and hardware-in-the-loop simulations for a hydrogen fuel cell plug-in hybrid electrical powertrain," in *Proc. 3rd World Congress of Young Scientists on Hydrogen Energy Systems (HYSYDAYS)*, Turin, Italy, Oct. 2009.
- C50 N. Chouhan and M. Ferdowsi, "Review of energy storage systems," in *Proc. IEEE North American Power Symposium (NAPS)*, Starkville, MS, Oct. 2009.
- C49 M. Khazraei and M. Ferdowsi, "Modified Projected Cross Point Control - a small signal analysis," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, San Jose, CA, Sept. 2009, pp. 3399-3403.
- C48 M. Khazraei and M. Ferdowsi, "Modified Projected Cross Point Control - a large signal analysis," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, San Jose, CA, Sept. 2009, pp. 3021-3025.
- C47 V. Prabhala, D. Somayajula, and M. Ferdowsi, "Power sharing in a double-input buck converter using dead-time control," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, San Jose, CA, Sept. 2009, pp. 2621-2626.

- C46 A. Meintz, M. Ferdowsi, and K. Martin, "Supervisory control development of fuel cell plug-in hybrid vehicle," in *Proc. IEEE Vehicle Power and Propulsion Conference (VPPC)*, Dearborn, MI, Sept. 2009, pp. 986-991.
- C45 S. Neglur and M. Ferdowsi, "Effect of battery capacity on the performance of plug-in hybrid electric vehicles," in *Proc. IEEE Vehicle Power and Propulsion Conference (VPPC)*, Dearborn, MI, Sept. 2009, pp. 649-654.
- C44 M. Ferdowsi, "Vehicle fleet as a distributed energy storage system for the power grid," in *Proc. IEEE Power Engineering Society General Meeting*, Calgary, Canada, July 2009. (**Invited Paper**)
- C43 D. Somayajula and M. Ferdowsi, "Power sharing in double-input buckboost converters using offset time control," in *Proc. IEEE 24th Applied Power Electronics Conference and Exposition (APEC)*, Washington D.C., Feb. 2009, pp. 1091-1096.
- C42 N. Sadati, S. Kaboli, H. Adeli, E. Hajipour, and M. Ferdowsi, "Online optimal neuro-fuzzy flux controller for DTC based induction motor drives," in *Proc. IEEE 24th Applied Power Electronics Conference and Exposition (APEC)*, Washington D.C., Feb. 2009, pp. 210-215.
- C41 K. Gummi and M. Ferdowsi, "Derivation of new double-input dc-dc converters using H-bridge cells as building blocks," in *Proc. 34th IEEE Annual Conference of the Industrial Electronics Society (IECON)*, Orlando, FL, Nov. 2008, pp. 2806-2811.
- C40 A. P. Prabhakar, H. T. Ma, D. D. Bollinger, M. Ferdowsi, and K. Corzine, "Efficiency analysis and comparative study of hard and soft switching dc-dc converters in a wind farm," in *Proc. 34th IEEE Annual Conference of the Industrial Electronics Society (IECON)*, Orlando, FL, Nov. 2008, pp. 2156-2160.
- C39 K. Wan and M. Ferdowsi, "Reducing computational time delay in digital current-mode controllers for dc-dc converters," in *Proc. IEEE International Telecommunications Energy Conference (INTELEC)*, San Diego, CA, USA, Sept. 2008.
- C38 A. Meintz and M. Ferdowsi, "Control strategy optimization for a parallel hybrid electric vehicle," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Harbin, China, Sept. 2008.
- C37 A. P. Prabhakar and M. Ferdowsi, "Comparison of NiMH and Li-Ion batteries in automotive applications," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Harbin, China, Sept. 2008.
- C36 A. Saplin, A. Meintz, and M. Ferdowsi, "Parametric study of alternative EV1 powertrains," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Harbin, China, Sept. 2008.
- C35 S. Jenkins and M. Ferdowsi, "HEV to PHEV conversion compatibility," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Harbin, China, Sept. 2008.
- C34 L. Shi, A. Meintz, and M. Ferdowsi, "Single-phase bidirectional dc-dc converters for plug-in hybrid electric vehicle applications," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Harbin, China, Sept. 2008.
- C33 D. Somayajula, A. Meintz, and M. Ferdowsi, "Study on the effects of battery capacity on the performance of hybrid electric vehicles," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Harbin, China, Sept. 2008. (**Best Paper Award**)

- C32 S. Jenkins, D. Rossmair, and M. Ferdowsi, "Utilization and effect of plug-in hybrid electric vehicles in the United States power grid," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Harbin, China, Sept. 2008.
- C31 J. Liao and M. Ferdowsi, "An improved cascaded H-bridge multilevel inverter controlled by an unbalanced voltage levels sigma-delta modulator," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Harbin, China, Sept. 2008.
- C30 M. Ferdowsi, "Plug-in electric drive vehicles: experiences in research and education," in *Proc. IEEE Power Engineering Society General Meeting*, Pittsburgh, PA, July 2008. (**Invited Paper**)
- C29 K. Wan and M. Ferdowsi, "Self-tuned projected cross point control of dc-dc converters," in *Proc. IEEE 39th Power Electronics Specialists Conference*, Island of Rhodes, Greece, Jun. 2008, pp. 3407-3411.
- C28 K. Gummi and M. Ferdowsi, "Synthesis of double-input dc-dc converters using a single-pole triple-throw switch as a building block," in *Proc. IEEE 39th Power Electronics Specialists Conference*, Island of Rhodes, Greece, Jun. 2008, pp. 2819-2823.
- C27 K. Wan and M. Ferdowsi, "Projected cross point - a new average current-mode control approach," in *Proc. IEEE 23rd Applied Power Electronics Conference and Exposition*, Austin, TX, Feb. 2008, pp. 65-70.
- C26 J. Liao, K. Corzine, and M. Ferdowsi, "A new control method for single-dc-source cascaded H-bridge multilevel converters using phase-shift modulation," in *Proc. IEEE 23rd Applied Power Electronics Conference and Exposition*, Austin, TX, Feb. 2008, pp. 886-890.
- C25 H. Mirzaee, A. Moallem, M. Zolghadri, and M. Ferdowsi, "A dual-frame hybrid vector-control of vector-modulated VIENNA rectifier for unity power factor operation under unbalanced mains condition," in *Proc. IEEE 23rd Applied Power Electronics Conference and Exposition*, Austin, TX, Feb. 2008, pp. 1402-1408.
- C24 M. Ferdowsi, "Plug-in hybrid electric vehicles - a vision for the future," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Dallas, TX, Sept. 2007, pp. 457-462. (**Invited Paper**)
- C23 A. M. Patel and M. Ferdowsi, "Advanced current sensing techniques for power electronic converters," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Dallas, TX, Sept. 2007, pp. 524-530.
- C22 J. Liao, K. Wan, and M. Ferdowsi, "Cascaded H-bridge multilevel inverters - a reexamination," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Dallas, TX, Sept. 2007, pp. 203-207.
- C21 K. Wan, J. Liao, and M. Ferdowsi, "Control methods in dc-dc conversion - a comparative study," in *Proc. IEEE 38th Power Electronics Specialists Conference*, Orlando, FL, Jun. 2007, pp. 921-926.
- C20 M. L. Crow, B. H. Chowdhury, K. A. Corzine, and M. Ferdowsi, "A first course in power: can a single course serve all students?" in *Proc. IEEE Power Engineering Society General Meeting*, Tampa, FL, Jun. 2007.
- C19 S. Lu, K. A. Corzine, and M. Ferdowsi, "A new method of utilizing ultra-capacitor energy sources in hybrid electric vehicles over a wide speed range" in *Proc. IEEE 22nd Applied Power Electronics Conference and Exposition*, Anaheim, CA, Feb. 2007, pp. 222-228.

- C18 S. Lu, K. A. Corzine, and M. Ferdowsi, "A unique ultracapacitor direct integration scheme in multilevel motor drives for large vehicle propulsion," in *Proc. 41st IEEE Industry Applications Conference (IAS Annual Meeting)*, vol. 5, Tampa, FL, Oct. 2006, pp. 2419-2426.
- C17 S. Lu, K. A. Corzine, and M. Ferdowsi, "High efficiency energy storage system design for hybrid electric vehicle with motor drive integration," in *Proc. 41st IEEE Industry Applications Conference (IAS Annual Meeting)*, vol. 5, Tampa, FL, Oct. 2006, pp. 2560-2567.
- C16 K. Wan and M. Ferdowsi, "A three-phase soft switching rectifier based on α CS α eta converter," in *Proc. IEEE 38th North American Power Symposium (NAPS)*, Carbondale, IL, Sept. 2006, pp. 243-248.
- C15 A. C. Baughman and M. Ferdowsi, "Analysis of the double-tiered three-battery switched capacitor battery balancing system," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Windsor, UK, Sept. 2006.
- C14 A. C. Baughman and M. Ferdowsi, "Evaluation of the new sensorless approach in energy storage charge balancing," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Windsor, UK, Sept. 2006.
- C13 K. P. Yalamanchili, M. Ferdowsi, and K. Corzine, "New double input dc-dc converters for automotive applications," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Windsor, UK, Sept. 2006.
- C12 M. Ferdowsi, "An estimative current mode controller for dc-dc converters operating in continuous conduction mode," in *Proc. IEEE 21st Applied Power Electronics Conference and Exposition*, Dallas, TX, Mar. 2006, pp. 1133-1136.
- C11 A. C. Baughman and M. Ferdowsi, "Double-tiered capacitive shuttling method for balancing series-connected batteries," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Chicago, IL, Sept. 2005.
- C10 A. C. Baughman and M. Ferdowsi, "Battery charge equalization—state of the art and future trends," in *Proc. SAE 2005 Future Transportation Technology Conference*, Chicago, IL, Sept. 2005.
- C9 D. S. Padimiti and M. Ferdowsi, "Review of digital control techniques for automotive dc-dc converters," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Chicago, IL, Sept. 2005.
- C8 K. P. Yalamanchili and M. Ferdowsi, "Review of multiple input dc-dc converters for electric and hybrid vehicles," in *Proc. IEEE Vehicle Power and Propulsion Conference*, Chicago, IL, Sept. 2005.
- C7 Z. Nie, M. Ferdowsi, and A. Emadi, "Boost integrated push-pull rectifier with power factor correction and output voltage regulation using a new digital control technique," in *Proc. IEEE International Telecommunications Energy Conference (INTELEC)*, Chicago, IL, USA, Sept. 2004, pp. 59-64.
- C6 M. Ferdowsi, A. Emadi, and M. Telefus, "A new control technique for dc-dc converters operating in discontinuous conduction mode," in *Proc. 11th EPE International Power Electronics and Motion Control Conference*, vol. 2, Riga, Latvia, Sept. 2004, pp. 133-138.

- C5) M. Ferdowsi, Z. Nie, and A. Emadi, "A new estimative current mode control technique for dc-dc converters operating in discontinuous conduction mode," in *Proc. International Power Electronics and Motion Control Conference*, Xi'an, China, Vol. 2, Aug. 2004, pp. 497-501.
- C4) M. Ferdowsi, A. Emadi, M. Telefus, and C. Davis, "Pulse Regulation Control Technique for BIFRED converter," in *Proc. IEEE 35th Power Electronics Specialists Conference*, Vol. 2, Aachen, Germany, June 2004, pp. 1545-1550.
- C3) M. Ferdowsi and A. Emadi, "Pulse regulation control technique for flyback converter," in *Proc. IEEE 19th Applied Power Electronics Conference and Exposition*, Vol. 3, Anaheim, CA, Feb. 2004, pp. 1745-1750.
- C2) M. Ferdowsi, A. Emadi, M. Telefus, and A. Shteynberg, "Suitability of pulse train, a novel digitally implemented real-time control technique, for BIFRED converter," in *Proc. IEEE International Telecommunications Energy Conference (INTELEC)*, Yokohama, Japan, Oct. 2003, pp. 542-548.
- C1) M. Telefus, A. Shteynberg, M. Ferdowsi, and A. Emadi, "Pulse train, a novel digital control method, applied to discontinuous conduction mode flyback converter," in *Proc. IEEE 34th Power Electronics Specialists Conference*, Vol. 3, Acapulco, Mexico, Jun 2003, pp. 1141-1146.

DEPARTMENT AND UNIVERSITY ACTIVITIES:

- Campus Personnel Committee (2011 - present).
- Executive Committee, Electrical and Computer Engineering Department (2012 - present).
- Power Group Coordinator (2012 - present).
- Research Investigator, Intelligent Systems Center, (2009 - present).
- Faculty Search Committee for power group faculty position (2007, 2012).
- NSF CAREER Mock Panelist for junior faculty at Missouri S & T (2007, 2009).
- Power Laboratory coordinator for the open houses of the Electrical and Computer Engineering Department (2004 - Present).
- Technical Advisor for the Lunar Miner Team (2006 - 2008).
- Technical Advisor for the Solar Car Team (2005, 2006, 2007).
- Technical Advisor for the Vehicle Design Summit (VDS) (2008).
- Technical Advisor for the EcoCAR Team (2008 - 2011).
- Freshman Engineering Program faculty advisor (2004 - 2007).
- Academic Advisor for ECE undergraduate students (2008 - present).

PROFESSIONAL SOCIETY MEMBERSHIP AND ACTIVITIES:

- Member, IEEE, Power Electronics Society (PELS), Power & Energy Society (PES), Industrial Electronics Society (IES), Industry Applications Society (IAS), Vehicular Technology Society (VTS).

- Associate Editor, IEEE Transactions on Power Electronics, 2005 till present.
- Track Chair and Session Chair for several IEEE sponsored conferences.
- Proposal reviewer for NSF CAREER, DOE, Canada NSERC, Chile FONDECYT, Kansas NSF EPSCoR, and Missouri Research Board.
- Reviewer for more than ten different IEEE journals.
- Reviewer for more than thirty IEEE sponsored conferences.
- External thesis examiner.
- Chair, IEEE Rolla Subsection of the St. Louis Section (2010, 2011).

AWARDED RESEARCH GRANTS AND CONTRACTS:

1. Title: Missouri S&T Microgrid Demonstration Employing Renewable Energy and Alternative Fuel Sources
 Source of Support: American Public Power Association
 Total Amount: \$200,000
 Role: PI, 75%
 Starting Date: June 2013 (18 months)
2. Title: REUSite: Technologies for Renewable Energy Generation
 Source of Support: National Science Foundation
 Total Amount: \$388,798
 Role: Co-PI, 15%
 Starting Date: January 2012 (36 months)
3. Title: Army Installation Electric Vehicle Demonstration Project
 Source of Support: U.S. Department of Defense
 Total Amount: \$240,560
 Role: PI, 60%
 Starting Date: May 2011 (24 months)
4. Title: Advanced Electric Drive Vehicles – A Comprehensive Education, Training, and Outreach Program
 Source of Support: U.S. Department of Energy
 Total Amount: \$5,000,000
 Role: PI, 39%
 Starting Date: January 2010 (48 months)
5. Title: Future Renewable Electric Energy Delivery and Management (FREEDM) Center

Source of Support: NSF (Engineering Research Center)

Total Amount: \$2,200,000

Role: Co-PI, 25%

Starting Date: September 2008 (72 months)

6. Title: Research on Alternative Sources of Energy to Power Transit Vehicles

Source of Support: U.S. Department of Transportation

Total Amount: \$1,918,873

Role: Co-PI, 40%

Starting Date: April 2008 (72 months)

7. Title: Development and Validation of Advanced Energy Management Control Algorithms for Short and Long Term Energy Storage

Source of Support: Sandia National Laboratories

Total Amount: \$618,740

Role: Co-PI, 25%

Starting Date: December 2007 (34 months)

8. Title: Performance Evaluation of Solid State Power Supplies for Neon Signs

Source of Support: Anheuser-Busch Companies, Inc.

Total Amount: \$12,963

Role: PI, 100%

Starting Date: May 2007 (16 months)

9. Title: CAREER: Vehicle Fleet as a Distributed Energy Storage System for the Power Grid

Source of Support: NSF (ECS - Power, Controls & Adaptive Networks)

Total Amount: \$400,000

Role: PI, 100%

Starting Date: February 2007 (60 months)

10. Title: Electric Motor Drives with Advanced Energy Storage

Source of Support: Missouri Research Board

Total Amount: \$28,948

Role: Co-PI, 33%

Starting Date: January 2007 (12 months)

11. Title: GAANN: Electric Energy Conversion for High Impact Applications in Power and Energy Systems

Source of Support: U.S. Department of Education
Total Amount: \$383,181
Role: Co-PI, 20%
Starting Date: August 2006 (36 months)

12. Title: UTC/Transportation Fuel Research and Development

Source of Support: Department of Transportation
Total Amount: \$183,952
Role: Co-PI, 10%
Starting Date: May 2006 (20 months)

13. Title: Vehicular Applications of Hybrid Energy Storage Systems

Source of Support: Missouri Research Board
Total Amount: \$27,300
Role: PI, 67%
Starting Date: January 2006 (12 months)

14. Title: Renewable Energy Supplies: Flywheels as Replacement for Chemical Batteries

Source of Support: Ameren
Total Amount: \$24,500
Role: PI, 100%
Starting Date: January 2006 (18 months)

M.Sc. GRADUATE STUDENTS:

MS13 Huawei Yang, *Efficiency Improvements in a Two-Phase High Gain Dc-Dc Converter*,
Expected Graduation Date: August 2014.

MS12 Stephen Moerer, *Design Considerations for a High Dc Gain Tapped Inductor Boost Converter*,
Expected Graduation Date: May 2014.

MS11 Anagha Rayachoti, *Control Considerations for Multi-Phase Power Electronic Converters*,
Expected Graduation Date: December 2013.

MS10 Omkar Chatpande, *Harmonic Compensation in a Grid Using Doubly-Fed Induction Generators*,
July 2013.

MS9 Nishant Chouhan, *Doubly Fed Induction Generator with Integrated Energy Storage System for Smoothing of Output Power*,
August 2010, (Danfoss).

MS8 Vennela Yadhati, *A Comparative Study of Capacitor Voltage Balancing Techniques for Flying Capacitor Multi-Level Power Electronic Converters*,
June 2010, (Smith Electric Vehicles).

MS7 Shweta Neglur, *Control and Design Considerations in Electric-Drive Vehicles*,
June 2010.

- MS6? Anand?Prabhala,?Control and Applications of Double Input DC-DC Power Electronic Converters,?May?2010,?(pursuing?PhD?at?Missouri?S&T).?
- MS5? Deepak?Somayajula,?Control Aspects of a Double-Input Buckboost Power Electronic Converter,?August?2009,?(pursuing?PhD?at?Missouri?S&T).?
- MS4? Karteek?Gummi,?Derivation of New Double-Input DC-DC Converters Using the Building Block Methodology,?November?2007,?(Bechtel).?
- MS3? Ashaben?Patel,?Current Measurement in Power Electronic and Motor Drive Applications – A Comprehensive Study,?November?2007,?(Dow?Chemical).?
- MS2? Krishna?Yalamanchili,?Multi-Input Dc-Dc Converters for Combined Energy Storage Systems in Hybrid Electric Vehicles,?December?2006,?(Laramore,?Douglass?and?Popham?Consulting?Engineers).?
- MS1? Andrew?Baughman,?New Techniques in Battery Charge Equalization,?July?2006,?(General?Motors).?

PH.D. GRADUATE STUDENTS:

- PhD13? Bhanu?Baddipadiga,?Dual Active Bridge Dc-Dc Converters,?Expected?graduation?date: December?2015.?
- PhD12? Anand?Prabhala,?New Topologies for High Dc Gain Converters,?Expected?graduation?date: December?2014.?
- PhD11? Sangin?Lee,?Three-Phase Solid State Transformers,?Expected?graduation?date: December?2014.?
- PhD10? Poriya?Fajri,?Testbed Development for Hybrid Electric Vehicles,?Expected?graduation?date: July?2014.?
- PhD9? Darren?Paschedag,?Bidirectional Battery Chargers for Plug-in Vehicles,?Expected?graduation?date: July?2014.?
- PhD8? Reza?Ahmadi,?Dynamic Modeling, Stability Analysis, and Controller Design for Dc Distribution Systems,?July?2013,?(Southern?Illinois?University?Carbondale).?
- PhD7? Zahra?Darabi,?Impact of Plug-in Hybrid Electric Vehicles on the Power Grid in a Smart Environment,?October?2012,?(SNC-Lavalin).?
- PhD6? Hossein?Sepahvand,?Addressing Control and Capacitor Voltage Regulation Challenges in Multilevel Power Electronic Converters,?October?2012,?(co-advisor?with?K.?Corzine),?(Petra?Solar).?
- PhD5? Mostafa?Khazraei,?Stability Challenges and Solutions in Current Controlled Power Electronic Converters,?April?2012,?(Solectria?Renewables).?
- PhD4? Andrew?Meintz,?Development of a Fuel Cell Plug-in Hybrid Electric Vehicle and Vehicle Simulator for Energy Management Assessment,?October?2011,?(General?Motors).?
- PhD3? Lisheng?Shi,?Advanced Dynamic Response Improvement Methods for Dc-Dc Power Electronic Converters,?July?2010,?(co-advisor?with?M.?Crow),?(Cree).?
- PhD2? Jingsheng?Liao,?Integration of Energy Storage Components with Cascaded H-Bridge Multilevel Converters,?August?2009,?(GE?Aviation).?

PhD1 Kai Wan, *Advanced Current-Mode Control Techniques for Dc-Dc Power Electronic Converters*, December 2008, (Cirrus Logic).