Curriculum Vitae

Mehdi Ferdowsi, Ph.D.

Electrical and Computer Engineering Department
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EDUCATION:

Ph.D.	Electrical Engineering	*Illinois Institute of Technology*	2004
M.Sc.	Electrical Engineering	*Sharif University of Technology*	1999
B.Sc.	Electrical Engineering	*University of Tehran*	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 J. 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.

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[1] formerly University of Missouri - Rolla (UMR)

<u>**RESEARCH AND TEACHING INTERESTS:**</u>

- Power electronics and energy conversion
- Renewable energy sources
- Energy storage systems
- Smart grid technology
- Electric, hybrid, and plug-in hybrid vehicles

<u>**TEACHING EXPERIENCE:**</u>

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

<u>**BOOK CHAPTER:**</u>

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 - 6 Volume Set, Richard C. Dorf, CRC Press, Boca Raton, FL, Jan. 2006.

<u>**PEER-REVIEWED JOURNAL PUBLICATIONS:**</u>

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, J. 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 mode 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 a 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 a 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," in *IEEE Trans. Industrial Electronics*, vol. 59, no. 2, pp. 769-778, February 2012.

J16   H. Sepahvand, J. 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. Yalamanchili, 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. 5, 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. 8, 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. 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. 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. 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 a 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. Yazdanian, M. R. Zolghadri, and M. Ferdowsi, "Comparing different rotor 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 a 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 a 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 61850-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. 200-2006.

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. Yousefpoor, 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 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, J. Yaghoobi, M. Zolghadri, and M. Ferdowsi, "Small-signal model development for a Cúk converter while operating in DCVM 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. Ishaku, 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 a 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. J. Prabhakar, H. T. Ma, J. 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. J. 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 ac-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, J. Rossmaier, 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 I 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, "An 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 a ZCS zeta 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 a 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: REU Site: 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 or 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 Ghatpande, H*armonic Compensation in a Grid Using Doubly-Fed Induction Generators*, July 2013.

MS9 Nishant Chouhan, *Doubly Fed Induction Generator with Integrated Energy Storage System for Smoothening 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 Tansformers*, 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, A*ddressing 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, D*evelopment 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).