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Personal Statement:

My research interests include megahertz wireless power transfer (WPT), high-frequency resonant circuits, and energy networks control. I have a multidiscipline background in power electronics, radio frequency and microwave, optimization, and control.

Education:

Ph.D. in Electrical and Computer Engineering 4/2013 - Present

Univ. of Michigan-SJTU Joint Institute, Shanghai Jiao Tong University GPA: 3.75/4 Rank: 4/14
Dissertation Title: "Analysis and Control of Megahertz Wireless Power Transfer Systems"

M.S. in Electrical and Computer Engineering 9/2010 - 3/2013

Univ. of Michigan-SJTU Joint Institute, Shanghai Jiao Tong University GPA: 3.84/4 Rank: 4/19
Thesis Title: "13.56 MHz Wireless Power Transfer System Design and Implementation"

B.S. in Electrical and Computer Engineering 9/2006 - 8/2010

Univ. of Michigan-SJTU Joint Institute, Shanghai Jiao Tong University GPA: 3.72/4 Rank: 3/78

Research Experience:

Multiple-Receiver Wireless Power Transfer System 4/2013 - Present

Analyze, design and implement a 6.78 MHz multiple-receiver WPT system. This system can automatically provide a constant voltage for each receiver with optimum efficiency.

High-Efficiency Resonant Converters for MHz Wireless Power Transfer 8/2014 - Present

Explore novel DC/AC and AC/DC circuits by using Class D and E topologies. These circuits can achieve better performance than traditional circuits, such as lower noise, higher efficiency, and smaller size.

13.56 MHz One-Receiver Wireless Power Transfer System 9/2010 - 3/2013

Design and build a 13.56 MHz WPT system driven by a standard RF power amplifier. This system can dynamically track the maximum efficiency under loading and coupling variation.

Project Experience:

Huawei (China) 9/2015 - present

Team leader

Explore and fabricate small and efficient battery management systems by using MHz wireless power transfer techniques.

Intel (USA) 9/2015 - present

Team member

Design and implement full-wave Class E rectifiers to achieve low harmonics and high efficiency in a WPT system supporting the A4WP standard.

Intel (USA) **Team leader** **8/2014 - 1/2015**
Develop auto-tuning Class E power amplifiers and high-efficiency Class E rectifiers for WPT systems supporting the A4WP standard. My works include circuit analysis, simulation, optimization, and implementation for the Class E rectifiers.

Intel (China) **Team member** **12/2012 - 6/2013**
Test, analyze, and optimize the WPT prototype system. My work is to provide possible solutions for efficiency improvement based on the measurement.

Bozun Motor (China) **Team member** **12/2011- 10/2012**
Design a controller for a high power (60 kW) disc-type motor. My works include the circuit parameters estimation and the components selection.

Nippon Chemi-Con (Japan) **Team member** **5/2011 - 9/2012**
Design and test the hybrid energy system (batteries + ultracapacitors). I help design the bidirectional DC/DC converter used in the system.

Intern Experience:

Shanghai R&D Center, Duraluxe **12/2012 - 11/2013**
Develop a 60 kW five-level solar grid-connected inverter. My works include the circuit design and test, the system integration, and the SVPWM-based control algorithm debug in a prototype system.

Power Electronics Division, Fuji Electric (China) Co. Ltd. **7/2012 - 9/2012**
Test the wind power IPM modules. I help the engineers to carry out 2KV electrostatic interference experiments, noise experiments, chopper experiments, and high temperature experiments.

Extracurricular Experience:

Gymnasium of Shanghai Jiao Tong University	Student fitness trainer	9/2010 - 3/2014
Shanghai 2010 EXPO	Volunteer	10/2010 - 11/2010
Volunteer Teaching in Yunan Province	High-school teacher	3/2007 - 4/2007

Honors & Awards:

Academic: [M.S. and Ph.D.] 2014 top ten research groups of SJTU, scholarship for new Ph.D. candidate (once), excellent graduate student scholarship (once), covidien scholarship (twice), miyoshi graduate student of SJTU (once), excellent party member of SJTU (once).

[B.S.]: dean's list (eight times, GPA > 3.5), third class SJTU scholarship (twice), and secondary class SJTU scholarship (once).

Social: yunxia outstanding project scholarship, 2012 annual excellent volunteer for blood donation.

Professional: gold prize in undergraduate capstone, second price of Infineon cup in the East China Area.

Certificates & Skills:

English: CET-6; GRE (1330); Fluent in speaking and writing.

Software: ADS, HFSS, altium designer, OrCAD, psipce, PSIM, matlab, maple.

Hardware: vector network analyzer, impedance analyzer, signal generator, spectrum analyzer, electronic load, oscilloscope, and various RF power sources.

Journal Papers:

- [1]. **M. Fu**, H. Yin, M. Liu, and C. Ma, "Analysis and Control for A 6.78 MHz Multiple-Receiver Wireless Power Transfer System Driven by Class E Power Amplifier", **under review**.
- [2]. **M. Fu**, H. Yin, M. Liu, and C. Ma, "A 6.78 MHz Wireless Power Transfer System with High Efficiency over A Wide Load Power Range", **under review**.
- [3]. **M. Fu**, T. Zhang, Patrick Chi Kwong Luk, X. Zhu, and C. Ma, "Compensation of Cross Coupling in Multiple-Receiver Wireless Power Transfer Systems," **under review**.
- [4]. M. Liu, **M. Fu** and C. Ma, "Parameter Design for A 6.78-MHz Wireless Power Transfer System Based on Analytical Derivation of Class E Current-Driven Rectifier", **accepted by IEEE Transactions on Power Electronics**.
- [5]. **M. Fu**, T. Zhang, C. Ma, X. Zhu, "Wireless Power Transfer Using Magnetic Resonance Coupling: Basic Considerations and Practices", Transactions of China Electrotechnical Society, vol. 30, sup. 1, pp.6-12, 2015. (Chinese)
- [6]. **M. Fu**, T. Zhang, C. Ma, and X. Zhu, "Efficiency and Optimal Loads Analysis for Multiple-Receiver Wireless Power Transfer Systems," **IEEE Transactions on Microwave Theory and Techniques**, vol. 63, no. 3, pp. 801–812, 2015.
- [7]. **M. Fu**, H. Yin, X. Zhu, and C. Ma, "Analysis and Tracking of Optimal Load in Wireless Power Transfer Systems," **IEEE Transactions on Power Electronics**, vol. 30, no. 7, pp. 3952–3963, 2015.
- [8]. **M. Fu**, C. Ma, and X. Zhu, "A Cascaded Boost-Buck Converter for High Efficiency Wireless Power Transfer Systems," **IEEE Transactions on Industrial Informatics**, vol. 10, no. 3, pp. 1972–1980, 2014.
- [9]. F. Wang, Y. Wang, and **M. Fu**, "Efficiency Optimization in Low and Medium Power Range of New Energy Grid-connected Three-level Inverter", Automation of Electric Power Systems, vol. 38, sup. 3, pp.101-105, 2014. (Chinese)

Conference Papers:

- [1]. **M. Fu**, Z. Tang, M. Liu, S. Liu, X. Zhu and C. Ma, "Output Power Improvement by Impedance Matching Networks for a Class E Power Amplifier Driven Wireless Power Transfer Systems", under review.
- [2]. M. Liu, **M. Fu**, Z. Tang, S. Liu, X. Zhu and C. Ma, "Design Procedure of a Class E DC/DC Converter for Megahertz Wireless Power Transfer", under review.
- [3]. Z. Tang, **M. Fu**, M. Liu and C. Ma, "Optimization of the Compensation Capacitors for Megahertz Wireless Power Transfer Systems", accepted by Annual Conference of the IEEE Industrial Electronics Society (IECON) 2015.
- [4]. H. Yin, **M. Fu**, M. Liu and C. Ma, "Power Distribution of a Multiple-Receiver Wireless Power Transfer System: A Game Theoretic Approach", accepted by Annual Conference of the IEEE Industrial Electronics Society (IECON) 2015.
- [5]. S. Liu, M. Liu, **M. Fu**, C. Ma, X. Zhu, "A High-Efficiency Class-E Power Amplifier with Wide-Range Load in WPT Systems", IEEE Wireless Power Transfer Conference, May 13-15, 2015, Boulder, Colorado, USA.
- [6]. **M. Fu**, Z. Tang, M. Liu, X. Zhu and C. Ma, "Full-Bridge Rectifier Input Reactance Compensation in Megahertz Wireless Power Transfer Systems", IEEE PELS Workshop on Emerging Technologies: Wireless Power (2015 WoW), June 5-6, 2015, Daejeon, Korea.
- [7]. M. Liu, **M. Fu**, Z. Tang, and C. Ma, "A Compact Class E Rectifier for Megahertz Wireless Power Transfer", IEEE PELS Workshop on Emerging Technologies: Wireless Power (2015 WoW), June 5-6, 2015, Daejeon, Korea.

- [8]. C. Zhao, H. Yin, **M. Fu**, C. Ma, "Analysis, control, and wireless charging of energy systems using ultracapacitors", 2014 IEEE International Electric Vehicle Conference, Dec. 17-19, 2014, Florence, Italy.
- [9]. **M. Fu**, T. Zhang, C. Ma, X. Zhu, "A Review of Megahertz Wireless Power Transfer Systems Based on Magnetic Resonance Coupling", 2014 International Conference of Wireless Power Transmission Technology and Application, Nov. 16, 2014, Nanjing, China. (Chinese)
- [10]. **M. Fu**, T. Zhang, X. Zhu, C. Ma: "Subsystem-Level Efficiency Analysis of a Wireless Power Transfer System", IEEE Wireless Power Transfer Conference, May 8-9, 2014, Jeju Island, Korea.
- [11]. T. Zhang, **M. Fu**, X. Zhu, C. Ma: "Optimal Load Analysis for a Two-Receiver Wireless Power Transfer System", IEEE Wireless Power Transfer Conference, May 8-9, 2014, Jeju Island, Korea.
- [12]. **M. Fu**, T. Zhang, C. Ma, X. Zhu: "Wireless Charging of A Supercapacitor Model Vehicle Using Magnetic Resonance Coupling", ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, August 4-7, 2013, Portland, OR, USA.
- [13]. **M. Fu**, T. Zhang, X. Zhu, C. Ma: "A 13.56 MHz Wireless Power Transfer System without Impedance Matching Networks", IEEE Wireless Power Transfer Conference, May 15-16, 2013, Perugia, Italy.
- [14]. C. Ma, X. Zhu, **M. Fu**: "Wireless Charging of Electric Vehicles: A Review and Experiments", ASME 2011 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Aug. 28–Aug. 31, 2011, Washington D. C., USA.