

# Mostak Mohammad

- Oak Ridge National Laboratory, Oak Ridge, TN, 37830
- Email: [mohammadm@ornl.gov](mailto:mohammadm@ornl.gov), Cell phone: (330)-687-8337

## EXPERIENCE

- Oak Ridge National Laboratory, TN, USA** *August 2019 - Present*  
*R&D Staff*
- The University of Akron, OH, USA** *June 2014 – May 2019*  
*Graduate Assistant*
- Robi Axiata Limited, Dhaka, Bangladesh** *July 2009 - June 2014*  
*Radio Network Planning*

## EDUCATION

- The University of Akron, Ohio, USA** *June 2014 – August 2019*  
**PhD** in Electrical Engineering
- Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh** *March 2004 – March 2009*  
**B.Sc.** in Electrical and Electronic Engineering

## AREAS OF EXPERTISE

- Wireless Charging for Electric Vehicles
- Rotary Transformer for WRSM
- Magnetics
- Finite Element Analysis

## HARDWARE AND SOFTWARES

- **Hardware:** Designing, prototyping, and testing of wireless charging systems (11-600 kW) and rotary transformers (5-10 kW).
- **Software:** COMSOL Multiphysics, ANSYS Maxwell, MATLAB, Simulink, and PLECS.

## PATENTS & IP

- [1] **M. Mohammad, et al.**, “Shield Design for Wireless Charging System”, **US Patent 11881726B2**, Jan. 2024.
- [2] P. Jason, **M. Mohammad, et al.**, “Tuning circuitry for a wireless power system”, **US Patent 11916404**, Feb. 2024.
- [3] **M. Mohammad, et al.**, “Shield Design for Wireless Charging System”, Publication of US20220242258A1
- [4] **M. Mohammad, et al.**, “Electric vehicle power module [Modular Power Source]”, U.S. Nonprovisional, UTB 4836, May 2022
- [5] **M. Mohammad, et al.**, “Rotor current prediction in an electric motor drive” Publication of US20230344321A1, Oct. 2023
- [6] **M. Mohammad, et al.**, “Rotary transformer with integrated power electronics”, Publication of US20230344317A1, Oct. 2023
- [7] **M. Mohammad, et al.**, “Only-stationary-side compensation network”, Publication of US20230344315A1, Oct. 2023
- [8] **M. Mohammad, et al.**, “PCB-based stranded, twisted excitation windings in rotary transformers”, Pub. of WO2023205516A1
- [9] **M. Mohammad, et al.**, “Thermal design of high-power wireless charging system”, Publication of US20240274352, Aug 2024
- [10] V. Rallabandi, **M. Mohammad, et al.**, “In-wheel motor with integrated wireless charging”, Appl. No: 18/205,289, July 2023.
- [11] **M. Mohammad, et al.**, “Unipolar polyphase wireless charging system”, U.S. Nonprovisional, March 2024.
- [12] **M. Mohammad, et al.**, “Wireless power transfer system [Triple Layer Coil]”, U.S. Nonprovisional 63/414,969, Oct. 2023.

## AWARDS

- **R&D100 Award** for “Compact and Lightweight Polyphase Extreme Fast Wireless Charging System”, Aug. 2024
- **2024 UT-Battelle Award** for “Groundbreaking development of a 270-kW high-power wireless EV charging system”, Sept. 2024
- **Significant Performance Award**, Oak Ridge National Laboratory, Dec. 2021, Dec. 2022, June 2024
- **ORNL Technology Transfer Award**, Oak Ridge National Laboratory, Dec. 2021
- **Best Contribution Paper Award**, IEEE Wireless Power Conference and Expo, June 2023
- **Prize Paper Award**, IEEE Transaction on Transportation Electrification, 2022
- **Best Paper Award**, IEEE Workshop on Control and Modeling of Power Electronics (COMPEL), Nov. 2020
- **Best Paper Award**, IEEE IAS Transportation Systems Committee, Sept. 2019
- **Outstanding Researcher Award**, University of Akron, June 2019
- **Paper Presentation Award**, IEEE Applied Power Electronics Conference (APEC), March 2016

## PUBLICATIONS

### Journals:

- [1] **M. Mohammad**, O. Onar, J. Pries, Veda P. Galigekere, Gui-Jia Su, and J. Wilkins, "Magnetic Shield Design for Double-D Coil-based Wireless Charging System", in *IEEE Transaction of Power Electronics*, July 2022.
- [2] **M. Mohammad**, J. Pries, O. Onar, Veda P. Galigekere, Gui-Jia Su, and J. Wilkins, "Bidirectional LCC-LCC Compensated 20 kW Wireless Power Transfer System for Medium-Duty Vehicle Charging", *IEEE Transactions on Transportation Electrification*, Jan. 2021. (**Prize Paper**)
- [3] **M. Mohammad**, E. T. Wodajo, S. Choi, M. Elbuluk, "Modeling and Design of Passive Shield to Limit EMF Emission and Minimize Shield Loss in Unipolar Wireless Charging System for EV," in *IEEE Transaction on Power Electronics*, Mar. 2019.
- [4] **M. Mohammad**, S. Choi, "Loss Minimization Design of Ferrite Core for Double-D Coil Wireless Charging System for Electrical Vehicles," in *IEEE Transaction on Transportation Electrification*, Oct. 2019.
- [5] **M. Mohammad**, S. Choi, M. Z. Islam, S. Kwak, and J. Baek, "Core Design and Optimization for Better Misalignment Tolerance and Higher Range Wireless Charging of PHEV," in *IEEE Transactions on Transportation Electrification*, Feb. 2017.
- [6] A. Aktas, O. Onar, E. Asa, **M. Mohammad**, B. Ozpineci, LM Tolbert, "Sensitivity Analysis of a Polyphase Wireless Power Transfer System under Off-Nominal Conditions" in *IEEE Transactions on Transportation Electrification*, Dec. 2023.
- [7] A. Foote, D. Costinett, R. Kusch, **M. Mohammad**, O Onar, "Fourier Analysis and Loss Modeling for Inductive Wireless Electric Vehicle Charging with Reduced Stray Field", in *IEEE Transactions on Transportation Electrification*, March 2024.
- [8] A. Foote; D. Costinett; R. Kusch; **M. Mohammad**; O. Onar, "Fourier Analysis and Design of a Shielded 120kW Inductive Wireless System", in *IEEE Transactions on Power Electronics*, July 2024.
- [9] L. Xue, V. Galigekere, E. Gurpinar, G. Su, S. Chowdhury, **M. Mohammad**, O. Onar, "Modular Power Electronics Approach for High Power Dynamic Wireless Charging System", in *IEEE Transactions on Transportation Electrification*, March 2024.
- [10] T. Mannan, A. Amin, S. Choi, **M. Mohammad**, "Designing of A > 1kV Medium-Voltage Line Impedance Stabilization Network", in *IEEE Transaction of Power Electronics*, Sept. 2024.

### Selected Conference Papers:

- [11] **M. Mohammad**, V. Rallabandi, L. Xue, G. Su, V. Galigekere, S. Chowdhury, J. Wilkins, "Self-Resonant Coil Design for High-frequency High-Power Inductive Wireless Power Transfer" *IEEE Wireless Power Technology Conference and Expo.*, June 2023. (**Best Paper Award**)
- [12] **M. Mohammad**, O. Onar, J. Pries, V. P. Galigekere, G. Su, and J. Wilkins, "Thermal Design and Optimization of High-Power Wireless Charging System", in *IEEE Applied Power Electronics Conference (APEC)*, March 2022.
- [13] **M. Mohammad**, O. Onar, J. Pries, V. P. Galigekere, G. Su, and J. Wilkins, "Thermal Analysis of 50 kW Three-Phase Wireless Charging System", in *IEEE Transportation Electrification Conference (ITEC 2021)*.
- [14] **M. Mohammad**, O. Onar, G. Su, J. Pries, V. P. Galigekere, and J. Wilkins, "Magnetic Field Emission and Shield Requirements for Interoperating High-Power EV Wireless Charging System," accepted in *IEEE Applied Power Electronics Conference (APEC 2021)*.
- [15] **M. Mohammad**, O. Onar, G. Su, J. Pries, V. P. Galigekere, and J. Wilkins, "Three Phase LCC-LCC compensated 50 kW Wireless Charging System with Non-Zero Interphase Coupling," accepted in *IEEE Applied Power Electronics Conference (APEC 2021)*.
- [16] **M. Mohammad**, J. Pries, O. Onar, Veda P. Galigekere, "Shield Design for 50 kW Three-Phase Wireless Charging System", *IEEE Energy Conversion Congress and Exposition (ECCE)*, Oct. 2020.
- [17] **M. Mohammad**, J. Pries, O. Onar, Veda P. Galigekere, Gui-Jia Su, and J. Wilkins, "Comparison of Magnetic Field Emission from Unipolar and Bipolar Coil-Based Wireless Charging Systems", *IEEE Transportation Electrification Conference and Expo, (ITEC)*, June 2020.
- [18] **M. Mohammad**, J. Pries, O. Onar, Veda P. Galigekere, Gui-Jia Su, S. Anwar, J. Wilkins, Utkarsh D. Kavimandan, and D. Patil, "Design of an EMF Suppressing Magnetic Shield for a 100-kW DD-Coil Wireless Charging System for Electric Vehicles", *IEEE APEC*, Mar. 2019.
- [19] **M. Mohammad**, J. Pries, O. Onar, V. P. Galigekere, Gui-Jia Su, S. Anwar, J. Wilkins, "Sensitivity Analysis of an LCC-LCC Compensated 20kW Bidirectional Wireless Charging System for Medium-Duty Vehicle", *IEEE Transportation Electrification Conf and Expo*, June 2019.
- [20] **M. Mohammad**, J. Pries, O. Onar, S. Anwar, V. P. Galigekere, Gui-Jia Su, J. Wilkins, "Comparison of Leakage Magnetic Field from Matched and Mismatched Double-D Coil based Wireless Charging System for Electric Vehicles" *IEEE Energy Conversion Cong and Expo*, 2019.
- [21] **M. Mohammad**, M. S. Haque, S. Choi, "A Litz-Wire Based Passive Shield Design to limit EMF Emission from Wireless Charging System" *IEEE Energy Conversion Congress and Exposition (ECCE)*, Sept. 2018. (**Best Paper Award**)
- [22] **M. Mohammad**, S. Choi, "Optimization of Ferrite Core to Reduce the Core Loss in Double-D Pad of Wireless Charging System for Electric Vehicles," *IEEE Applied Power Electronics Conference (APEC)*, Mar 2018.
- [23] **M. Mohammad** and S. Choi, "Sensor-less estimation of coupling coefficient based on current and voltage harmonics analysis for wireless charging system," *IEEE Energy Conversion Congress and Exposition (ECCE)*, Sept. 2017.
- [24] **M. Mohammad**, S. Kwak, and S. Choi, "Core Design for Better Misalignment Tolerance and Higher Range of Wireless Charging for HEV," *IEEE Applied Power Electronics Conference (APEC)*, 2016. (**Paper Presentation Award**)
- [25] A. Foote, D. Costinett, R. Kusch, J. Pries, **M. Mohammad**, B. Ozpineci, "Fourier Analysis Method for Wireless Power Transfer Coil Design", *IEEE 21st Workshop on Control and Modeling for Power Electronics (COMPEL)*, Nov. 2020. (**Best Paper Award**)
- [26] M. S. Haque, **M. Mohammad**, S. Choi, "Comparison of 22 kHz and 85 kHz 50 kW Wireless Charging System using Si and SiC Switches for Electric Vehicle," *IEEE Workshop on Wide Bandgap Power Devices and Applications (WiPDA)*, Oct 2018.
- [27] E. Asa, **M. Mohammad**, O. Onar, J. Pries, Veda P. Galigekere, and Gui-Jia Su, "Review of Safety and Exposure Limits of Electromagnetic Fields (EMF) in Wireless Electric Vehicle Charging (WEVC) Applications", *IEEE Transportation Electrification Conf and Expo*, June 2020.
- [28] E. Gurpinar, **M. Mohammad**, *et al.*, "Failure Modes and Effects Analysis for Wireless and Extreme Fast Charging," Department of Transportation. National Highway Traffic Safety Administration, United States, [Online]: <https://rosap.ntl.bts.gov/view/dot/57152>, 2021.
- [29] O. Onar, G. Su, **M. Mohammad**, *et al.*, "A 100-kW Wireless Power Transfer System Development Using Polyphase Electromagnetic Couplers", *IEEE Transportation Electrification Conference & Expo (ITEC)*, June 2022.