

Mehrdad Biglarbegian

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Last Update: March 2018

Education

- Aug. 2014 - **Ph.D. in Electrical Engineering**, *University of North Carolina at Charlotte (UNCC), USA.*
 - Present ○ Major Field: Power Electronics Engineering, ADVISER: DR. BABAK PARKHIDEH
 - Dissertation: High Frequency Power GaN Converters Digital Twin
- Oct. 2011 - **M.Sc. in Energy Engineering**, *Politecnico di Milano (Polimi), Italy.*
 - Apr. 2014 ○ Major Field: Renewable Energy Engineering, ADVISER: DR. FABIO RINALDI
- Sep. 2005 - **B.Sc. in Electrical Engineering**, *University of Tehran (UT), Iran.*
 - Jun. 2010 ○ Major Field: Power System Engineering

Work & Research Experiences

- Aug. 2014 - **Graduate Researcher**, PV INTEGRATION LAB, University of North Carolina at Charlotte, Charlotte, USA.
 - present ○ Reliability analysis on GaN converters
 - *Parallel multi-physics simulation and applying deep learning for failure analysis in GaN converters*
 - Printed Circuit Board (PCB) embedded inductors
 - *Development and characterization of 300W air-core PCB embedded inductor for <10MHz inverters*
 - Multipurpose converter for advanced learner in power electronics
 - *Design and implementation of 2kW DC-AC, DC-DC converters with analogue and digital controller*
 - Current measurement for high frequency converters
 - *Implementation of SenseGaN current monitoring and novel zero current detection technique*
 - *Development of novel zero current detection technique using SenseGaN*
 - *Analogue controller design for DC-DC buck converter with Magnetoresistor current sensors*
 - *Implementation of 1kW GaN power converter on cloud-based Rds(on) monitoring for reliability test*
- Jul. 2016 - **Power Electronics Intern**, ABB CORPORATE RESEARCH CENTER, Raleigh, USA.
 - Dec. 2016 ○ Design of high switching frequency 5kW inverters using GaN transistors
 - Simulation and verification of customized heat-sink design for cooling down semiconductor
 - Development of system platform for zero current detection without a current sensor
- May. 2016 - **Visiting Scholar**, KARLSRUHE INSTITUTE OF TECHNOLOGY-IIP, Karlsruhe, Germany.
 - Jul. 2016 ○ Development of possible solutions for black start of power networks with 100% renewable energy
- Dec. 2014 - **Analogue Power Electronics Engineer**, SINEWATTS, Charlotte, USA.
 - Mar. 2016 ○ Design of apparatus distributed 2kW photovoltaic molecules inverter molecules at 500kHz
 - Design and implementation of analogue/digital controller for 500kHz photovoltaic inverters
 - Design of efficient magnetic differential and common-mode inductor design for cascaded converters
 - Development of I-V sweep board for maximum power point tracking of photovoltaic generations
- Apr. 2013 - **Graduate Researcher**, AUTOMATION OF COMPLEX POWER SYSTEMS, RWTH, Aachen, Germany.
 - Sep. 2013 ○ Algorithm development for renewable energy source generations
 - *Design of Kalman filter estimator for Photovoltaic generations in 15 minutes time intervals*
 - *Developed novel algorithm for operational of micro-CHP and Heat Pumps for residential applications*
- Jul. 2008 - **Intern and Electrical Engineer**, GITAL COMPANY, Tehran, Iran.
 - Aug. 2011 ○ Engineering and development (part-time)
 - *Design of LV 4000A electrical Busducts for power transformers*

Publications

- 2018 M. Biglarbegan, N. Kim, and B. Parkhideh, **Boundary Conduction Mode Control of Boost Converter with Active Switch Current-Mirroring Sensing**, *IEEE Transactions on Power Electronics*
- 2018 M. Biglarbegan, S. Mostafavi, S. Hauer, S. Nibir, N. Kim, R. Cox and B. Parkhideh, **On Condition Monitoring of High Switching Frequency Power GaN Converters with Adaptive Prognostics**, *IEEE-APEC*
- 2018 M. Biglarbegan, I. Mazhari, H. Jafarian, N. Kim, J. Enslin, and B. Parkhideh, **Multi-Purpose Generic Board for Hands-on Power Electronics Education of Different Power Converter Topologies in PV Applications**, *IEEE-APEC*
- 2018 M. Biglarbegan, N. Kim, T. Zhao, and B. Parkhideh, **Development of Isolated SenseGaN Current Monitoring for Boundary Conduction Mode Control of Power Converters**, *IEEE-APEC*
- 2018 N. Kim, M. Biglarbegan, and B. Parkhideh, **Flexible High Efficiency Battery-Ready PV Inverter for Rooftop Systems**, *IEEE-APEC*
- 2018 S. Nibir, S. Hauer, M. Biglarbegan, and B. Parkhideh, **Wideband Contactless Current Sensing Using Hybrid Magnetoresistor-Rogowski Sensor in High Frequency Power Electronic Converters**, *IEEE-APEC*
- 2017 M. Biglarbegan, and B. Parkhideh, **Characterization of SenseGaN Current-Mirroring for Power GaN with the Virtual Grounding in a Boost Converter**, *IEEE-ECCE*
- 2017 M. Biglarbegan, H. Jafarian, and B. Parkhideh, **On Self-Healing of Grid-tied PV Inverters Considering Current Sensor Inaccuracy and Aging Degradation**, *IEEE-ECCE*
- 2017 (Best Presentation Award) H. Jafarian, M. Biglarbegan, and B. Parkhideh, **Controller Robustness Analysis of Grid-tied AC-stacked PV Inverter System Considering Manufacturing Inaccuracies**, *IEEE-APEC*
- 2016 S. Nibir, M. Biglarbegan, and B. Parkhideh, **Performance Study of Magnetic Field Concentration Techniques on Magnetoresistor/Rogowski Contactless Current Sensor**, *IEEE Sensors*
- 2016 M. Biglarbegan, S. Nibir, H. Jafarian, and B. Parkhideh, **Development of Current Measurement Techniques for High Frequency Power Converters**, *IEEE-INTELEC*
- 2016 M. Biglarbegan, S. Nibir, H. Jafarian, and B. Parkhideh, **Layout Study of Contactless Magnetoresistor Current Sensor for High Frequency Converters**, *IEEE-ECCE*
- 2016 (Best Presentation Award) M. Biglarbegan, N. Shah, I. Mazhari, J. Enslin, and B. Parkhideh, **Design and Evaluation of High Current PCB Embedded Inductor for High Frequency Inverters**, *IEEE-APEC*
- 2015 M. Biglarbegan, N. Shah, I. Mazhari, and B. Parkhideh, **Design Considerations for High Power Density/Efficient PCB Embedded Inductor**, *IEEE-WiPDA*
- 2014 M. Biglarbegan, **Design, Implementation and Evaluation of Cooperative Methods for Short Term Compensation of Deviations from the Load Schedule for 2DSM**, *M.Sc. thesis, Politecnico di Milano*
- 2014 I. Stoyanova, M. Biglarbegan, and A. Monti, **Cooperative Energy Management Approach for Short-Term Compensation of Demand and Generation Variations**, *IEEE-SysCon*

Patents

- 2017 M. Biglarbegan, N. Kim, and B. Parkhideh **Current Monitoring for Power GaN Transistors**, *US Application Patent #28221856, filed January 2017.*
- 2015 M. Biglarbegan, N. Shah, and B. Parkhideh, **High Power Density Printed Circuit Board Embedded Inductors**, *US Granted Patent #20170149356, filed November 2015.*

Technical Report

- 2017 National Science Foundation Annual Report, Amendment #4, **Hybrid Sensor and High Frequency Circuit**, *Jun. 2017, NSF Project #1610250*

Selected Projects & Presentations

- Spring 2018 Online Reliability Assessment of GaN Power Converters - APEC conf.
- Fall 2017 Characteristics of SenseGaN Current Mirroring & the Applications - ECCE conf.
- Fall 2017 On-Self Healing of PV Inverter Considering Current Sensing Inaccuracies - ECCE conf.
- Fall 2017 Reliability Enhancement for WBG Power Converters with Machine Learning Techniques - ABB Group
- Fall 2016 Development of Current Measurement Techniques for High Frequency Power Converters - INTELEC conf.
- Summer 2016 Development of Possible Solutions for Black Start of Power Network with 100% Renewable Energy - KIT
- Spring 2016 Design and Evaluation of High Current PCB Embedded Inductor for High Frequency Inverters - APEC conf.
- Spring 2016 Hands-On Learning In Power Electronics Converter Design - Workshop Tours in California Universities
- Fall 2015 Design Considerations for High Power Density/Efficient PCB Embedded Inductor - WiPDA conf.
- Fall 2015 Thermal Management of High Power Density Printed Circuit Board Embedded Inductors - NAPS conf.
- Fall 2015 Design and Implementation of Distributed Control Architecture of AC-Stacked PV Inverter - NAPS conf.
- Summer 2013 Design of Cooperative Methods for Compensation of Deviations of Load Schedule in 2DSM - Thesis
- Fall 2011 PEM Fuel Cells for Distributed Generation Applications - Chemical Systems
- Spring 2010 Design of 200W, 3kHz DC-AC Converter with Regenerative Breaking for Electric Vehicle - Industrial Electronics
- Spring 2009 Surge Arrester and Properties for Distribution Systems - Switchgear Design
- Fall 2008 Hot Line Repair and Maintenance in Transmission Lines - Transmission Line Design

Computer Skills

- Engineering Software LTSPICE, Matlab/Simulink, COMSOL, JMAG, Cadence PSpice, Allegro PCB Design, Altium PCB design, Power Factory, DIALUX, PSCAD, Word, Excel, Powerpoint, Visio, Access, AutoCAD, Mathcad, \LaTeX
- Programming Languages Code Composer Studio, Python, VHDL

Teaching Experiences

o University of North Carolina at Charlotte

- Junior Design (Instructor and Teaching Assistant) *Spring'18*
- Systems and Electronics Lab (Instructor and Lead Supervisor) *Fall'17*
- Systems and Electronics Lab (Instructor and Supervisor) *Spring'16*
- Power Electronics Workshops (Instructor and Supervisor) *Spring'16*
- Logic and Networks Lab (Instructor and Supervisor) *Spring'16*

o University of Tehran

- Principle of Electrical Engineering (Head Teaching Assistant) *Spring'08, Fall'08, Spring'09*
- Electrical Machine Lab (Supervisor) *Spring'08, Fall'08, Spring'09*

Graduate Coursework

Power Quality in Distribution System, Utility Application in Power System, Optimal Control Theory, Energy Data Analytics, Relays and Protection, Power Electronics, High Voltage Direct Current, Electricity Marketing and Smart Grids, Power Conversion for Renewable Energy Sources, Advanced Thermodynamic and Heat Transferring, Mathematics Finite Element Method and Optimization, Energy and Technologies for Building Systems, Energy Systems and Low Carbon Technologies, Bio-Energy and Waste to Energy Plants

■ Honors and Awards

- 2018 **Outstanding Graduate Assistant**, *University of North Carolina at Charlotte, 2017/2018*
- 2017 **Best Presentation Award**, *Applied Power Electronics Conference (APEC), Reliability Session, Mar. 2017*
- 2016 **Full Research Fellowship**, *Energy Production and Infrastructure Center (EPIC), 2016-2017*
- 2016 **Ph.D. Visiting Scholar**, *Karlsruhe Institute of Technology, Summer 2016*
- 2016 **Best Presentation Award**, *Applied Power Electronics Conference (APEC), Device Session, May. 2016*
- 2015 **Mentor of Best M.Sc. Thesis (Mr. Neel Shah)**, *University of North Carolina at Charlotte, 2015*
- 2016 **Lead of Educational Power Electronics Workshop**, *University of North Carolina at Charlotte, Jan. 2016*
- 2013 **Admitted as Exchange Student for M.Sc. Thesis**, *RWTH, Feb. 2013*
- 2012 **Full Scholarship for M.Sc. Program**, *Politecnico di Milano, 2012*
- 2011 **Full Scholarship for M.Sc. Program**, *Politecnico di Milano, 2011*

■ Academic Responsibility

- Active IEEE Student Member
- Active Member of IEEE Young Professionals
- Active Member of IEEE Power & Energy Society
- Senior Member of GridEd-East Student Innovation Board
- Active Member of IEEE Power Electronics Society (IEEE-PELS)
- Technical Peer Reviewer for International Power and Energy Journals and Conferences:
 - IEEE Transactions in Power Electronics, IEEE Journal of Emerging and Selected Topics in Power Electronic, International Transactions on Electrical Energy Systems
 - IEEE Energy Conversion Congress and Exposition, IEEE Applied Power Electronics Conference, IEEE Power Africa, IEEE Sensors, IEEE North American Power Symposium