

Rohail Hassan

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EDUCATION

PhD, Electrical Engineering

Utah State University, Logan, UT-84341

CGPA 4.00/4.00

Spring 2020 (Expected)

PhD candidate with a focus on power electronics applications in energy storage and electrified transportation

Advisor: Dr. Regan Zane

MS, Electrical Engineering

Rensselaer Polytechnic Institute (RPI), Troy NY.

CGPA 3.62/4.00

May 2017

MS with a focus on power electronics applications in energy harvesting for wireless sensor nodes.

Advisor: Prof. Leila Parsa

Bachelor of Engineering (B.E.), Electrical Engineering

Lahore University of Management Sciences, Lahore, Pakistan

CGPA 3.83/4.00

June 2012

Thesis: "Renewable source integration and home energy management for smart home" with Nauman Zaffar

PROFESSIONAL EXPERIENCE

Utah State University

Research Assistant, SELECT center.

May 2017 – present

- UPEL lab
- Current work focuses on energy storage utilization on shipboard medium-voltage dc power system

Rensselaer Polytechnic Institute

Teaching Assistant, Department of ECSE.

August 2015 – May 2017

- Embedded Control Lab
- Introduction to ECSE
- EPE Lab

Dynamic Systems Inc. (Gleeble Systems)

Electrical Engineering Intern, R&D.

June 2016 – Aug 2016

- Developed hardware interface between different sensors and their embedded system,
- Developed an online method to characterize and auto-tune the PID controls for the Gleeble Welding Simulator's hydraulic piston.
- Reference (James Benway, Dynamic Systems Inc., Gleeble Systems)

Rensselaer Polytechnic Institute, Troy, NY

Research Assistant, Center for Future Energy Systems (CFES), Dept. of ECSE.

August 2012 – May 2015

Research advisor: Prof. Jian Sun

- Developed new system level control for multi-terminal HVDC system for offshore wind farms
- Developed controls in FPGA for a voltage-source converter built in-lab
- Implemented Hardware-in-the-Loop testing of HVDC using Opal-RT systems and Simulink/MATLAB
- Implemented real-time simulation of modular multilevel converter

Lahore University of Management Sciences, Lahore, Pakistan

Teaching Assistant, Department of Electrical Engineering.

August 2011 – June 2012

- Signals and Systems
- Electric Power Engineering

RELEVANT COURSES

- *Power Electronics for Electric Vehicles* (USU, Fall 2017): Electric drivetrain components, modeling and control of power converters in EV, energy storage, battery management systems, hybrid EV architectures and control

- *Advance Power Electronics* (RPI, Spring 2014): PWM dc-dc converters, resonant and soft-switching techniques, average modelling and analysis, current-mode control, single-phase PFC, EMI and EMI filtering. Project: Design and implement a 1 kW Phase-Shifted Full-Bridge Converter with Synchronous Rectifier
- *Power Quality* (RPI, Spring 2013): 3-phase voltage-source converters, harmonics, 3-phase PFC, multi-pulse rectifiers, grid-synchronization and DQ current control, renewable energy integration, harmonic resonance, electromagnetic interference.
- *Semiconductor Power Electronics* (RPI, Fall 2012): ac-dc, dc-dc, dc-ac converters, steady-state and dynamic analysis.
- Analog IC Design (RPI Fall 2016): Integrated amplifier design using CMOS technology, single-ended/differential amplifiers. Project: Operational Transconductance Amplifier for a sample-and-hold circuit.
- *Other Courses*: Digital Control Systems (RPI), Nonlinear Control Systems (RPI), System Analysis Techniques (RPI)

PUBLICATIONS

- R. Hassan and J. Sun, "Voltage Balancing and Control of Series-DC Collection Systems for Offshore Wind Power Plants," presented at *Wind Integration Workshop (WIW)*, Berlin, 2014.
- S. Shah, R. Hassan and Jian Sun, "HVDC transmission system architectures and control – A review," in *Proc. IEEE 14th Workshop on Control and Modelling for Power Electron. (COMPEL)*, pp. 1-8, 23-26 June 2013.
- M. M. U. Rehman, R. Hassan and N. Zaffar, "High efficiency modified dual active bridge converter for photovoltaic integration," *2013 IEEE Grenoble PowerTech (POWERTECH)*, pp. 1-5, 16-20 June 2013.

SIGNIFICANT PROJECTS

Energy storage for stability enhancement of shipboard medium-voltage dc power systems

- MVDC shipboard power system stability monitoring using onboard energy storage
- Adaptive stability enhancement of shipboard MVDC power system utilizing energy storage

Operational Transconductance Amplifier for a sample-and-hold circuit

- Developed a fully integrated circuit of a differential OTA with realistic biasing and common-mode feedback
- Gain >90dB, GBW >500MHz, phase margin >70°, 2V_{p-p} differential swing
- Winner of Analog Devices Inc. Design Contest (Fall 2016), held as part of the Analog IC Design course project
- References (Prof. Mona Hella, hellam@ecse.rpi.edu; Siddharth Devarajan, ADI, siddharth.devarajan@analog.com)

Multi-terminal HVDC for Offshore Wind Farms and Hardware-in-the-Loop Test-Bed

- Developed supervisory control to mitigate voltage unbalance in series-dc collection systems for offshore wind farms
- Developed real-time simulation for demonstration of the project
- Helped set-up hardware including VSC modules built in-lab for testing of series connection

Design and Testing of a Phase-Shifted Full-Bridge Series Resonant Converter with Synchronous Rectifier

- Designed the magnetics and switching circuitry for a kW range phase-shifted full-bridge series resonant converter
- Built and tested the zero-voltage switching operation of the bridge, and synchronous rectification

Renewable Source Integration and Energy Management of Smart Home

- Developed a dual-active bridge dc-dc converter as a step-up stage for integrating 12 V Battery to the grid
- Designed and built a high frequency transformer for the dc-dc converter for 400 W power

CleverGrid (Microsoft Imagine Cup 2011 Finalist)

- Designed a GSM-based three-tier metering system to solve electricity shortage issue in Pakistan
- My responsibility included design and building of smart utility meter equipped with GSM communication and control logic implemented in AVR micro-controller

RELEVANT SKILLS

- Simulation and mathematical tools: Spice Softwares, SABER, Simulink/MATLAB, Opal-RT (real-time), Cadence, Mathematica, OrCAD Capture, PSCAD
- Control and modelling of power electronic converters, experience with voltage-source converter hardware
- CMOS integrated amplifier design
- Experience with microcontroller, FPGA and DSP programming and interfacing, and PCB design tools
- Programming languages including Verilog HDL, VHDL, c, c++, python
- Documentation: Adobe FrameMaker, Microsoft Office

AWARDS AND HONORS

- Research assistantship at Rensselaer Polytechnic Institute in CFES, Dept. of ECSE
- Finalists at 2011 Microsoft Imagine Cup in Embedded Systems category
- Dean's Honor List: Throughout in Undergrad