# Zakariya M. Dalala, Ph.D.

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## EDUCATION:

- **2013: Ph.D.** in Electrical Engineering, Virginia Polytechnic Institute and State University, Electrical & Computer Engineering Department.

  Ph.D. Thesis: "Design and Analysis of a Small-Scale Wind Energy Conversion System"
- **2008: MS.** in Electrical Engineering, University of Jordan.

  Master Thesis: "Optical Wavelength division Demultiplexing with Monitoring Channels"
- **2005: BS.** in Electrical and Electronics Engineering, Jordan University of Science and Technology.

## EMPLOYMENT HISTORY:

- **June, 2014 – Present:** Assistant Professor, German Jordanian University, Energy Engineering Department.

- **December, 2013 – June, 2014:** Design Engineer III, Research and Development Section, Regal Beloit America, Blacksburg, VA 24060 USA

  - Development of power electronics and control implementation using MCUs for variable speed motor drives of various power ranges from medium power (400 Hp) to fractional HP.
  - Gate drive design, discrete hardware component selection based on application requirements, control strategy and reliability considerations.
  - Analysis, simulation, and verification of the power electronics design using fundamental modeling softwares.
  - Evaluation of electronics using SPICE simulators.
  - Design of linear and non-linear discrete time controllers for verification of control design prior to implementation on MCUs.

- **July, 2010 – December, 2013**: Graduate Research Assistant at Future Energy Electronics (FEEC), Virginia Tech.
  -Joining various in-lab research projects with duties including:
  - Hardware design and implementation.
  - Testing and installation.
  - Power electronics converters modeling and control.
  - Renewable energy power electronics development for solar and wind energy.

- **August, 2008 to August, 2009**: At German-Jordanian University as Teaching Assistant Electrical Engineer.
  - Supervision on Electrical Engineering Labs.

- Teaching various Electrical Engineering labs, including Electronics, Digital Electronics, Circuits and Digital Design labs for undergraduate levels.
- Engineering Labs monitoring, improvement and manual creation and revision.

- **May, 2005 to June, 2008:** At Antares Advanced Test Technology – United States / DCI (Dimensions Consulting Incorporation) / Jordan Division as a PCB Layout Design Engineer. My main responsibilities varied as follows:

  – PCB layout designer. Board divisions: Design of high performance PCB boards to include load boards, DUT cards, Tester interface boards, Random logic boards and customer specific bench boards.
  – Utilize Cadence Allegro Design package.
  – Creating Schematics and Layout part libraries using Capture CIS and Concept HDL.
  – PCB routing including high speed test boards, digital and analog test boards.
  – Producing manufacturing plots and design reports.
  – Setup new design templates for high speed analog, digital, and mixed signal b oards.

- **November 1st, 2004 to April 27, 2005**: employed at Arab Broadcasting Services (ABS) as Digital TV Broadcasting Engineer:
  – Technical Support, IT Services, Video & Audio Network administration, Multiplexing, Encoding and DVB Uplink for a lot of Satellite TV stations, SNG operation (fixed and mobile).

## PROJECTS AND RESEARCH:

- **Undergraduate Project: Wireless-Based Control System:**

  An IR based communication system is designed and implemented to control a digital clock system, where a DTMF IC is used as an FSK signal generator and receiver.

- **Master Thesis: "Optical Wavelength division Demultiplexing with Monitoring Channels"**

  In this thesis, a combined demultiplexer/channel monitoring module using multilayer structure design is proposed and investigated. The main function of the proposed module is to demultiplex multi-wavelength beam of light using the virtue of the material dispersion possessed by the silica, which is the building material. The design block is modified to support the monitoring capability of the channels.

- **Ph.D. Thesis: "Design and Analysis of a Small-Scale Wind Energy Conversion System"**

  In this work, a complete small- scale wind energy conversion has been designed, modeled and experimentally built. Various control algorithms have been tested and novel controllers have been proposed and validated including MPPT and Stall control. Hardware included power electronic converters design and implementation, Motor drive control and DSP implementation.

- **Ph.D. Research & Projects:**
  - Design, modeling and implementation of three-phase boost rectifier for **Wind Energy** conversion system.
  - Design and implementation of a bidirectional onboard battery charger for **Electric Vehicle (EV)** using CLLLC resonant converters.

- Design, modeling and implementation of three-phase current source inverter for **Motor Drive** application.
- Sinusoidal PM machine drive with low resolution Hall-Effect Position sensors plus sensorless control implementation.
- Complete PCB design for high performance DSP chip (TMS320F28335) application board (responsible for designing, testing and verification of the complete system interface board using Cadence tools).
- Design and implementation of a single-phase three-wire bidirectional high efficiency PFC front end stage.

- **Key Course Work and design skills:**

  - Modeling and control of DC/DC PWM converters.
  - Modeling and Control of 3-Phase PWM converters (AC/DC).
  - Advanced linear control theory.
  - Advanced power conversion: design, modeling and control .
  - Advanced control engineering.
  - Advanced digital control systems.
  - Advanced digital signal processing.
  - Alternative Energy Systems.
  - Power Electronics: Design, Modeling and Control.

- **Design and modeling packages**: PSIM, Simplis, Orcad, Matlab, Mathematica, LTspice, Saber, Allegro, OrCAD, Altium Designer.

- **PUBLICATIONS:**

- **Zakariya M. Dalala**, Zaka Ullah Zahid, Wensong Yu, Younghoon Cho and Jih-Sheng Lai, "Design and Analysis of a MPPT Technique for Small Scale Wind Energy Conversion Systems" *IEEE Transactions on Energy Conversion,* vol. 28, issue 3, pp. 756-767, 2013.

- **Zakariya M. Dalala**, Zaka Ullah Zahid and Jih-Sheng Lai, "New Overall Control Strategy for Small Scale WECS in MPPT and Stall Regions with Mode Transfer Control" *IEEE Transactions on Energy Conversion,* vol.28, issue 4, pp. 1082-1092. 2013.

- **Zakariya M. Dalala**, Younghoon Cho and Jih-Sheng Lai, "Enhanced Vector Tracking Observer for Rotor Position Estimation for PMSM Drives with Low Resolution Hall-Effect Position Sensors" *IEEE Proceeding of the IEMDC*, May, 2013.

- **Zakariya M. Dalala**, Zaka Ullah Zahid and Jih-Sheng Lai, "New Overall Control Strategy for Wind Energy Conversion Systems in MPPT and Stall Regions", *IEEE Proceeding of the Energy Conversion Congress and Exposition (ECCE),* September 2013.

- **Zakariya M. Dalala**, Zaka Ullah Zahid and Jih-Sheng Lai, "Design and Development of Wind Energy Battery Charger with Multimode Control", *IEEE Transaction on Industrial Electronics, Submitted for publication.*

- Zaka Ullah Zahid, **Zakariya M. Dalala**, Jih-Sheng (Jason) Lai, "Small-Signal Modeling of Series-Series Compensated Induction Power Transfer System", *IEEE Proceeding of the Applied Power Electronics Conference (APEC), 2014*, March 2014.

- Atieh, A.; Mansour, I.; **Dalala, Z**., "Novel Multilayer Structure Demultiplexer in Silica" *Communications and Photonics Conference and Exhibition*, 2011. ACP. Asia.

## PROFESSIONAL SERVICE:

### Reviewer for:

- IEEE Transactions on Power Electronics.
- IEEE Transactions on Energy Conversion.
- IEEE Transactions on Industrial Electronics.
- IEEE Transactions on Industrial Applications.
- IEEE Transaction on Sustainable Energy.
- International Transactions on Electrical Energy Systems.
- IEEE Energy Conversion Congress and Expositions (ECCE).
- IEEE Applied Power Electronics Conference (APEC).
- IEEE International Electric Machines & Drives Conference (IEMDC).

## ACHIEVEMENTS AND AWARDS:

- Undergraduate Degree Fellowship, Jordan University of Science and Technology, Jordan, 2000-2005.
- Ph.D. Scholarship, Ministry of Higher Education, Jordan, 2009-2013.
- Graduate Research Assistantship, ECE Department, Virginia Tech, USA, 2010-2013.
- Best Paper Award, IEEE Energy Conversion Congress and Exposition (ECCE), Sept. 2013.

## PROFESSIONAL ASSOCIATIONS MEMBERSHIP:

- Jordan Engineers Association
- Institute of Electrical and Electronics Engineers (IEEE)

## REFERENCES:

- **Prof. Jason Lai, Virginia Tech.**
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