

IBRAHIM ABUSHMAIS, PH.D.

SUMMARY OF QUALIFICATIONS

- 7 years of industrial research experience within power electronic converters and semiconductor devices
- Design and analysis of power electronics converters
- Electrical circuits simulation including PSIM Matlab, Simulink, LTspice
- Commercial power supply design for telecom and datacenter applications
- In-depth knowledge of electrical power engineering subjects and eager to assume teaching responsibilities

RESEARCH INTERESTS

- High frequency, high-density power electronic converters
- High-performance converters
- Planar magnetics design
- Modelling of semiconductor devices
- Wide bandgap semiconductor devices (SiC and GaN)

TEACHING INTERESTS

- Power electronic devices and circuits
- Power system analysis, transmission and distribution
- Electrical circuits analysis
- Power semiconductor devices
- Renewable energy sources
- Electrical machines

EDUCATION

Ph.D., Electrical Power Engineering

11. 2007- 10.2012

Norwegian University of Science and Technology, Trondheim, Norway

DISSERTATION: *SiC Power Diodes and Junction Field-Effect Transistors: Testing, Characterization, Modeling and Applications.*

M.Sc., Electrical Power Engineering

08.2006 - 11.2007

Chalmers University of Technology, Göteborg, Sweden

THESIS: *Design and Control of Six-phase Synchronous Machine.*

Average of 5 on a scale of 1-5 where five is the highest

B.Sc., Electrical Engineering Technology, with major in Electrical Power Engineering

06.2000- 06.2005

Hijjawi Faculty for Technology, Yarmouk University, Jordan

GPA (86,5%), Excellent

ACADEMIC HONORS AND AWARDS

- Best Student Award: Yarmouk University, 2002, 2003 & 2005. (During B.Sc.)
- Deans Honor List: 2002, 2003, 2004 & 2005. (During B.Sc.)
- Adlerbert Foreign Student Hospitality Foundation Scholarship: Chalmers University, December 2006
- Best student paper award: 2007 (During M.Sc., Chalmers University local conference)
- Doctoral Research Fellowship of the Norwegian Council of Research, January 2011

Professional Experience

Senior Research and Development Engineer **01.2015–09.2018**

Delta Electronics group, Eltek AS, Drammen, Norway

Research and Development Engineer **09.2012–01.2015**

Eltek ASA, Telecom and industrial application division, Drammen, Norway

Participating in R&D activities that mainly include:

- Design and optimization of power rectifiers for telecommunication and data center applications.
- Testing and evaluation of new semiconductor power devices both conventional silicon-based and emerging SiC and GaN devices.
- Testing and ensuring modules accordance to international standards in connection to EMI and surge immunity.
- Using enterprise application (IFS & SAP) for bill of material (BOM) creation and maintaining.

Eltek ASA, Renewable Energy division, Kristiansand, Norway **01.2012 – 08.2012**

Development of a single-phase grid-connected photovoltaic inverter.

Fellow Researcher **05.2007 –11.2007**

ABB Corporate Research, Västrås, Sweden

The main tasks included designing and optimizing a multi-megawatt six-phase synchronous machine design. Design verifications and parametric studies were conducted using a Finite Element Method (FEM) computer-aided tool.

Electrical Engineer **08.2005 - 08.2006**

Jordanian Electric Power Company, JEPCO, Jordan

I worked with the Technical Division team. The division is responsible for providing various technical supports for other company divisions. My duty included maintaining the Geographical Information System "GIS" used for the distribution system updated and participating in the Assets Management systems.

Trainee Project Engineer **09.2004 - 02.2005**

Construction Development Company (CDC Inc.), Qatar

Acted as trainee project engineer, the work mainly included managing and supervising some electrical installation activities primarily intended for household applications. The duties included supervising the technicians' workflow, ensuring the installation is done according to the relevant standard, coordinating the necessary approval with a consultant, and ensuring that all installation activities run according to the project plan. This experience was part of the undergraduate training program for distinguished students in Hijawi faculty.

Academic Experience

Assistant Professor **09.2019-Now**

09.2017-09.2018

Department of Electrical Engineering, Princess Sumaya University for Technology, Jordan

Taught Course: Power Electronics, Advanced Power Electronics, Power System Analysis, Power System Design, Electrical Circuits, Renewable Energy Sources, Transmission and Distribution Systems, Power System Lab, Power System Protection Lab

Teaching assistance and laboratory tutor

08.2008 - 05.2010

Norwegian University of Science and Technology, Norway

- Power Electronics for Renewable Energy: A fourth-year course discussing the concepts of power electronic converters and their applications focusing on renewable energies. For three terms
- Design of Power Electronic Converters: A fifth-year (Master) course deals with power devices physics and converter design aspects. Thermal management, Snubber circuits design, gate drivers and emerging power electronic devices. For one term

Special Courses

New Trends in Soft Switching Topologies, by Lonel Jitaru

19.05.2014

During the International Exhibition and Conference for Power Electronics PCIM, Nuremberg, Germany, May 2014.

Thermal Engineering of Power Electronics Systems: Thermal Management and Reliability

19-20.10.2010

At the European Center for Power Electronics, Nuremberg, Germany.

Power Semiconductor Devices and Technologies

05-06.02.2009

At the European Center for Power Electronics, Nuremberg, Germany.

Mastering Electrical Engineering Concepts Using Matlab / Simulink and Toolboxes

01- 05.08.2001

Jordan University for Science and Technology, Jordan

Academic Research & Projects

Modeling and Characterization SiC Power Devices: during my PhD study number of laboratory measurements and computer simulations were carried out to analyze several SiC devices. Power rectifiers i.e. PiN and Schottky diodes as well as two power transistors (VJFET & BJT) were selected. The work involves device behavior at elevated temperature, driving circuitry design and computer models.

Modern SiC Power Devices for PV and Down-hole Applications: investigation of the ability to use emerging SiC devices in PV inverters and high-temperature down-hole motor drives applications. The project involves two master students in close contact with relevant industries.

Characterization, Reliability and Failure Mechanisms of Modern IGBT Modules: A co-supervision of a MSc student who is studying IGBT modules for subsea applications. The project comprises studying different IGBTs performance at elevated temperatures.

Design and Control of Six-phase Synchronous Machine: A part of a research group with ABB Corporate Research AB, Sweden. Several FEM simulations were conducted to understand the air-gap harmonics phenomenon occurring inside a six-phase synchronous machine. The machine reliability and short circuit behavior were also investigated.

Simulating and Prototyping of Single-phase Claw Pole Motor: a project during MSc study. The aim was to prototype a single-phase claw pole motor, test it and then compare results with FEM simulation of the motor.

Simulation of Single-Phase Induction Motor Transients Using Matlab: Motor switching transients were simulated using Matlab/Simulink. Different motor starting transient conditions were investigated. This was a part of BSc studies.

Computer Skills

- Matlab/Simulink, PSIM, LTspice, PSCAD.
- Finite Element Method (FEM) tools: Ansys Maxwell
- Windows OS, MS Office, MS project.

Professional Memberships

- IEEE.
- JEA (Jordan Engineers Association).

Publications

Journal :

- Shahroury, F.; Ahmad, H.; **Abuismais, I.** Design Aspects of a Single-Output Multi-String WLED Driver Using 40 nm CMOS Technology. J. Low Power Electron. Appl. 2022, 12(1), 5; <https://doi.org/10.3390/jlpea12010005>.
- Ahmad, H.; Shahroury, F.; **Abuismais, I.** A Multi-Output Multi-String High-Efficiency WLED Driver Using 40 nm CMOS Technology. J. Low Power Electron. Appl. 2021, 11(4), 47; <https://doi.org/10.3390/jlpea11040047>.
- Raya O. Jaradat, Fadi R. Shahroury, Hani H. Ahmad, **I. Abuismais**, "Design Methodology For Narrow-Band Low Noise Amplifier Using CMOS 0.18 um Technology", Jordanian Journal of Computers and Information Technology (JJCIT) ,Volume 08, Number 01, pp. 98 - 111, March 2022, doi: 10.5455/jjcit.71-1637577305.
- **Ibrahim Abuismais** and Tore M. Undeland, "SiC Devices for Renewable and High-Performance Power Conversion Applications," Journal of Advances in Power Electronics, vol. 2012, ISSN: 2090-1828. Article ID 765619, 2012. doi:10.1155/2012/765619.

Conferences:

- **I. Abuismais** and F. R. Shahroury, "Bidirectional Dual Active Bridge for Interfacing Battery Energy Storage Systems with DC Microgrid," 2021 International Conference on Electrical, Computer and Energy Technologies (ICECET), 2021, pp. 1-5, doi: 10.1109/ICECET52533.2021.9698654.
- S Tiwari, **I. Abuismais**, JK Langelid, R Lund, "Characterization of body diodes in the-state-of-the-art SiC FETs-Are they good enough as freewheeling diodes?", 20th European Conference on Power Electronics, 2018.
- OC. Spro, S. Basu, **I. Abuismais**, OM. Midtgård, "Driving of a GaN enhancement mode HEMT transistor with Zener diode protection for high efficiency and low EMI", 19th European Conference on Power Electronics, 2017.
- **Abuismais, Ibrahim**; Basu, Supratim; Undeland, Tore Marvin. "On understanding and driving SiC power JFETs." Proceeding of International Applied Power Electronics Conference and Exposition (APEC), 2011 Twenty-Sixth Annual IEEE. IEEE Press 2011 ISBN 978-1-4244-8084-5. s. 1071-1075
- **Abuismais, Ibrahim**; Undeland, Tore Marvin." Dynamic characterization of 63 mΩ, 1.2 kV, normally-off SiC VJFET." Power Electronics and ECCE Asia (ICPE & ECCE), 2011 IEEE 8th International Conference on. IEEE Press 2011 ISBN 978-1-61284-958-4. pp. 1206-1210.
- Tiwari, Subhadra; **Abuismais, Ibrahim**; Undeland, Tore Marvin; Bøysen, Kjetil. "Silicon Carbide Power Transistors for Photovoltaic Applications." In PowerTech 2011 Proceedings. IEEE conference proceedings, 2011 ISBN 978-1-4244-8417-1. pp. 1-6
- **Abuismais, Ibrahim.**, Basu, Supratim and Undeland, Tore Marvin. "On Driving SiC Power JFETs". Proceedings of the 14th International Power Electronics and Motion Control Conference, EPE-PEMC 2010. IEEE conference proceedings 2010 ISBN 978-1-4244-7854-5.
- Xiao, Di., **Abuismais, Ibrahim** and Undeland, Tore Marvin. "Switching Characteristics of NPT-IGBT Power Module at Different Temperatures". Proceedings of the 14th International Power Electronics and Motion Control Conference, EPE-PEMC 2010. IEEE conference proceedings 2010, ISBN 978-1-4244-7854-5.
- **Abuismais, Ibrahim.**, and Undeland, Tore Marvin. "Simplified Models of Forward Conduction for SiC Power PiN and Schottky Diodes with Temperature Dependency". 5th IET International Conference on Power Electronics, Machines and Drives (PEMD 2010). IEEE Press 2010 ISBN 978-1-84919-231-6.
- **Abuismais, Ibrahim.**, Arshad, Waqas M. and Kanerva, Sami. "Analysis of VSI-DTC Fed 6-phase Synchronous Machines". 13th International Power Electronics and Motion Control Conference. Poznan, Poland: IEEE / EPE-PEMC2008 2008, ISBN 978-1-4244-1742-1.

Personal Details

- Date of Birth: 2nd August 1982, Amman, Jordan
- Languages: Arabic, English, Norwegian(basic)