

DAVID BAMGBOJE

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Career Summary

Extensive experience in Electrical Engineering particularly in Power Electronics, Power Management, Circuit Analysis, PCB Design, Switched-Mode Power Supply, PFC, AC/DC, DC/DC Converters, Inverters, LED Drivers, PWM Dimming, Microcontroller, Signal Processing, Acoustic Sensor, EMI filter, Wind Turbine and Product Certification.

Education

Ph.D., Electrical Engineering	GPA: 4.00/4.00	May 2019
University of Massachusetts Lowell		Lowell, MA
<i>Dissertation Title: "Low cost high performance power electronic interfaces for LED driving and energy harvesting"</i>		
<i>Advisor: Professor Tingshu Hu</i>		
M.Sc., Electrical Engineering	GPA: 6.90/7.00	March 2016
University of Ibadan		Nigeria
B.Sc., Electrical Engineering	GPA: 4.39/5.00	March 2012
Obafemi Awolowo University		Nigeria

Skills Summary

Programming – MATLAB, C++
Simulation and Design Software – SPICE, SIMPLIS, MATHCAD, EAGLE, Xpedition 2409, CCStudio, uVision, Simulink
Certification – Occupational Safety and Health Supervisor, 2013

Research Experience

Research Assistant, University of Massachusetts Lowell, Lowell MA	Jan. 2017 – May 2019
Low cost power management of Triboelectric Nanogenerators (TENG)	Feb. 2019 – Present
<ul style="list-style-type: none">• Develop an LTspice model for TENG's open circuit voltage and nonlinear input capacitance• Propose self-powered switching module and design power management circuit• Build power management circuit on breadboard to validate performance	
High performance self-oscillating buck converter LED driver	Jan. 2018 – Present
<ul style="list-style-type: none">• Developing a converter that rectifies AC supply and steps it down for LED lighting applications• Conducting extensive research, applying theoretical analysis and SPICE for LED driver design• Building a prototype with characteristics comparable to a 94% efficient SPICE simulation	
Microphone pre-amplifier for a Wind Turbine Health Monitor (WTHM)	Dec. 2018 – Jan. 2019
<ul style="list-style-type: none">• Collaborated with colleagues from Computer and Mechanical Engineering on WTHM project• Analyzed, simulated and proposed low cost microphone amplifier to monitor turbine damages• Built a 15 USD PCB prototype comparable to a 1500 USD professional condenser Mic system	
Low cost LED driver based on a self-oscillating boost converter	Jan. 2018 – Dec. 2018
<ul style="list-style-type: none">• Developed a low cost E-cap-less LED driver to prolong the lifespan of LED fixtures• Conduct detailed research, apply theoretical analysis and SPICE for LED driver design• Built a 5 USD PCB prototype with 95.9% efficiency and 5% to 95% smooth PWM dimming	

- LED driver with PWM dimming via synchronous integral control** July 2017 – Dec. 2017
- Designed a current-controlled single input multiple output boost converter LED driver
 - Applied MATLAB Simulink for simulations and eZdsp TMS320F28335 for feedback control
 - Built a three-output breadboard prototype with 95.5% efficiency and independent current control

- Built Ćuk, Buck and SEPIC converters for experimental purposes** May 2017 – July 2017
- Conducted circuit analysis, MATLAB and SPICE simulation of Ćuk, buck and sepic converters
 - Built a breadboard prototype for laboratory demonstration

- Zero voltage switched Boost converter** Jan. 2017 – April 2017
- Simulated and built a closed loop boost converter on a breadboard for laboratory demonstration
 - Modified the design to enable zero voltage switching to minimize converter's switching losses

Graduate Assistant, University of Ibadan, Nigeria June 2014 – March 2016

- Optimal placement of wind turbines using genetic algorithm** Oct. 2014 – March 2016
- Proposed a two-stage genetic algorithm to solve the wind farm layout optimization problem
 - Relative to existing predetermined layouts, the proposed layout yielded lower cost per unit power

- Analysis of permanent magnet synchronous motor (PMSM)** June 2014 – Sept. 2014
- Conducted mathematical modeling and MATLAB simulation of PMSM
 - Investigated the effect of five different permanent magnets and recommended NdFeB

Professional Experience

- Power Electronics Engineer II, SpaceX, Redmond WA** August 2023 – Present
- End-to-end simulation, design and DO-160G certification of a 360-800Hz, AC/DC, 40W WIFI router power supply for in-flight internet access in the aviation industry
 - Design, simulation and certification of a 360-800Hz, AC/DC, 400W antenna power supply for in-flight internet access in the aviation industry
 - Validation, testing and repair of prior generation of Solar Array Power Converter and Aviation Power Supply
 - HALT and HASS campaign for satellite 8kW Solar Array Power Converter
 - Validation, testing and repair of prior generation of Solar Array Power Converter and Aviation Power Supply

- Sr. Electrical Engineer, ePropelled Inc, Lowell MA** July 2019 – July 2023
- Design and simulation of 0.5-12kW power management units for UAV, EV and Water Pumps
 - Starter-generator closed loop control for 0.5-12kW power management units
 - 12kW buck-based power converter design with active current sharing (within 1%)
 - Validation, testing and repair of power management units
 - Design of 230VAC boost PFC to generate 400VDC for 2.5kW water pump controller
 - 96% efficient 3hp PFC plus inverter water pump controller design using Infineon IMC302A
 - Design and simulation for water pump controller UL and CE certification
 - LCD display controller using TI f280025 microcontroller
 - Water pump display serial data translator using STM32F103

- Assistant E&M Engineer**, Eny Construction Limited, Calabar, Nigeria June 2012 – Feb. 2014
- Coordinated all E&M planning activities, ensured appropriate Personal Protective Equipment (PPE) usage and educated staff on safe practices
 - Collaborated in change control management, configuration management, cost management, system assurance and interface management
 - Executed project management contract activities including inspection and site activities surveillance on construction work

Teaching Experience

Adjunct Faculty, University of Massachusetts Lowell, Lowell MA Sept. 2019 – May 2020
Introductory Circuit Theory I (EECE 2010 – 54 Students) Sept. 2019 – May 2020

- Teaching fundamental concepts such as Ohm's law, KVL, KCL, mesh analysis and so on
- Teaching problem solving skills applicable for first, second order and complex circuits
- Provide tutoring, consultation periods and exam proctoring
- Grade homework, papers, reports and other work assigned to the enrolled students

Teaching Assistant, University of Massachusetts Lowell, Lowell MA Jan. 2017 – May 2019
Introduction to Data Communications (EECE 2460 – 103 Students) Sept. 2017 – May 2019

- Provide tutoring, consultation periods and exam proctoring
- Substitute for the instructor in the event of absence
- Grade homework, papers, reports and other work assigned to the enrolled students

Engineering Mathematics (EECE 3640 – 25 Students) Jan. 2017 – May 2017

- Provided recitation sessions to work on homework and midterm problems
- Held regular office hours to guide students in areas they find challenging
- Graded homework, quiz and proctored exams

Graduate Assistant, University of Ibadan, Nigeria June 2014 – March 2016
Power Electronics and Drives Laboratory (TEL 536 – 22 Students) Oct. 2014 – March 2016

- Built closed loop boost converter for laboratory demonstration
- Prepared the laboratory and provided guidance to student during each laboratory exercise
- Graded weekly laboratory reports, exams and provided solution materials

Applied Electricity (TEL 231 – 34 Students) June 2014 – Sept. 2014

- Provided consultation periods, tutoring and exam proctoring
- Filled-in for the instructor in the event of absence
- Graded assignment, quiz and provided solution materials

Awards

- 2019 Dean's Gold Medal for Outstanding Graduate Academic Achievement
- 2019 Outstanding PhD Graduate Student Award

Recent Publications

- T. Hu, H. Wang, **D. Bamgboje**, and W. Harmon, “Power Management Systems for Triboelectric Nanogenerators”, *Handbook of Triboelectric Nanogenerators*, Springer, 2023.
- T. Hu, H. Wang, W. Harmon, **D. Bamgboje**, and Z. Wang, “Current progress on power management systems for triboelectric nanogenerators”, *IEEE Transactions on Power Electronics*, 2022.
- **D. Bamgboje**, W. Harmon and T. Hu, "Self-oscillating Buck Converter LED Driver with Indirect Inductor Current Reconstruction," *2021 IEEE Applied Power Electronics Conference and Exposition (APEC)*, 2021.
- **D. Bamgboje**, W. Harmon and T. Hu, "Low Cost Diode-blocked Self-oscillating Boost Converter," *2021 IEEE Applied Power Electronics Conference and Exposition (APEC)*, 2021.
- **D. Bamgboje**, I. Christoulakis, I. Smanis, G. Chavan, R. Shah, M. Malekzadeh, I. Violaris, N. Giannakeas, M. Tsipouras, K. Kalafataki, A. Tzallas, “Continuous Non-Invasive Glucose Monitoring via Contact Lenses: Current Approaches and Future Perspectives”, *Biosensors*, 2021.
- M. Tahan, **D. Bamgboje**, and T. Hu, “Compensated Single Input Multiple Output Flyback Converter”, *Energies*, 2021.
- W. Harmon, H. Guo, **D. Bamgboje**, T. Hu, and Z. Wang, “Timing strategy for boosting energy extraction from triboelectric nanogenerators”, *Nano Energy*, 2021.
- W. Harmon, **D. Bamgboje**, H. Guo, T. Hu, and Z. Wang, “Self-driven Power Management System for Triboelectric Nanogenerators”, *Nano Energy*, 2020
- **D. Bamgboje**, W. Harmon, M. Tahan, and T. Hu, “Low Cost High Performance LED Driver Based on a Self-Oscillating Boost Converter”, *IEEE Transactions on Power Electronics*, 2019.
- M. Tahan, **D. Bamgboje**, and T. Hu, “Flyback-Based Multiple Output dc-dc Converter with Independent Voltage Regulation”, in *9th IEEE International Symposium on Power Electronics for Distributed Generation Systems (PEDG)*, 2018.
- M. Tahan, **D. Bamgboje**, and T. Hu, “Hybrid control system in an efficient LED driver”, in *American Control Conference (ACC)*, 2018.
- A. Ogunjuyigbe, R. Ayodele, and **D. Bamgboje**, “Optimal placement of wind turbines within a wind farm considering multi-directional wind speed using two-stage genetic algorithm”. *Frontiers in Energy*, 2017.

Patent Applications

- “Power Management System for Energy Harvested by Triboelectric Nanogenerators” with United States Application or PCT International Application Number 62/969,995 filed on 02/04/2020.

Professional Memberships

- Institute of Electrical and Electronics Engineers (IEEE)
- Institute of Electrical and Electronics Engineers - Industrial Electronics Society (IEEE IES)

References

Professor Tingshu Hu

Professor Yan Luo

Professor Siavash Pakdelian

ECE, UMass Lowell,

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