

# Curriculum Vitae

## Husien Salama, Ph.D.

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## Summary

- Specialization in *power transmission, semiconductor devices, and renewable energy systems*.
  - Strong background in circuit design, CMOS/MOSFET modeling, and nanoscale device physics.
  - Extensive academic research and international collaborations with institutions in the U.S., Tunisia, and Algeria.
  - Published in high-speed electronics, nanotechnology, and energy system journals and conferences.
  - Over 10 years of engineering and research experience at GECOL, including projects with Siemens and ABB.
  - Recipient of multiple honors and awards for excellence in research and engineering.
  - Actively engaged in proposal development, innovation in energy systems, and microelectronics research.
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## Education

**Doctor of Philosophy (Ph.D.), Electrical Engineering** – Aug 2020

University of Connecticut, Storrs, CT

**Master of Science (M.S.), Electrical Engineering** – May 2013

University of Bridgeport, Bridgeport, CT

**Master of Science (M.S.), Technology Management** – May 2014

University of Bridgeport, Bridgeport, CT

**Bachelor of Science (B.S.), Electrical & Electronic Engineering** – Jul 1998

Bani Waled Technical Institute, Libya

*Specialization: Power Transmission and Distribution*

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## Research Contributions (2020 – Present)

- Conducting research with **UConn groups** and **graduate candidates in the ECE Department**, focusing on advanced topics in electrical engineering and collaborative student projects.
  - Collaborating with **Dr. Faouzi Nasri** – Center for Research in Microelectronics & Nanotechnology, Sousse, Tunisia; Laboratory of Thermal Processes, Research and Technology Centre of Energy, Hammam Life, Tunisia.
  - Collaborating with **Dr. Billel Smaani** – Abdelhafid Boussouf University Centre of Mila, Algeria.
  - Current research areas: **power transmission, renewable energy systems, microelectronics, and integrated circuit design**.
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## Proposals

- Preparing proposal submission to the **National Science Foundation (NSF)** and improving a novel model that can forecast the electro-thermal performance of three-dimensional FETs or surrounding-gate (SG) and fin-gate transistors.
- Drafting additional proposals for **international energy and power distribution projects** (details to be finalized).
- Modeling for CMOS circuit design. A CMOS transistor consists of a P-channel MOS (PMOS) and an N-channel MOS (NMOS). A CMOS device operates like other FETs but uses an extra oxide layer between the gate and substrate.
- Elucidation of the impact of nano heat transfer variability on three-dimensional field-effect transistors. This work

proposes a new model to predict the electro-thermal performance of three-dimensional field-effect transistors (3-D FETs), including Fin FET and Surrounding-Gate (SG)-FET transistors. The Drift-Diffusion (D-D) model proposes an electrical model in conjunction with an effective electron mobility model.

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## Research Projects (Primary Investigator)

- Quantum Dot Channel FETs and Nonvolatile Random Access Memory (NVMs)
- Designed NVMs by integrating cladded GeOx-Ge quantum dots in both floating gates and transport channels, enhancing memory performance and retention characteristics.
- Spatial Wave Switching Field Effect Transistor (SWS-FET) and 2-bit Compact DRAMs.
- Developed novel DRAM architecture achieving ~50% reduction in cell area using one SWS-FET and two capacitors for 2-bit storage. Leveraged multi-channel spatial wavefunction switching to improve memory density and scalability.

Semiconductor materials and device physics

- Investigated and developed using the Analog Behavioural Model (ABM).
  - Multiple quantum well channel spatial wavefunction switched FETs (SWS-FETs)
  - Novel electronic materials and their applications
  - Nanoscale transistors and short channel effects
  - Nanostructured devices and quantum confinement effects
  - Non-volatile memory (QDNVM) and quantum devices
  - Energy bands and electrical conduction
  - Semiconductor surface physics
  - DRAM (Dynamic Random Access Memory) cells and logic gates.
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## JOURNALS, CONFERENCES, AND POSTERS

- Twin Drain Quantum Well/Quantum Dot Channel Spatial Wave-Function Switched (SWS) FETs for Multi-Valued Logic and Compact DRAMs H Salama, B Saman, E Heller, RH Gudlavalleti, R Mays, F Jain International Journal of High-Speed Electronics and Systems 27 (03n04), 1840024
- A novel addressing circuit for SWS-FET-based multivalued dynamic random-access memory array RH Gudlavalleti, B Saman, R Mays, H Salama, E Heller, J Chandy, F Jain International Journal of High-Speed Electronics and Systems 29 (01n04), 2040009
- Numerical investigation of the electrothermal properties of SOI FinFET transistor F Nasri, H Salama

International Journal of High-Speed Electronics and Systems 32 (02n04), 2350020 Nanotechnology and quantum dot lasers

- H Salama, B Smaani, F Nasri, A Tshipamba Journal of Computer Science and Technology Studies 5 (1), 45-51
- Compact 1-bit full adder and 2-bit SRAMs using n-SWS-FETs H Salama, B Saman, R Gudlavalleti, R Mays, E Heller, J Chandy, F Jain International Journal of High-Speed Electronics and Systems 29 (01n04), 2040013
- Implementation of the information H Salama, C International Journal of Innovation and Applied Studies 27 (2), 456-462
- Simulation of stacked quantum dot channels SWS-FET using multi-FET ABM modeling H Salama, B Saman, RH Gudlavalleti, PY Chan, R Mays, B Khan, E Heller, International Journal of High Speed Electronics and Systems 28 (03n04), 1940025
- A robust second-order conic programming model with effective budget of uncertainty in optimal power flow problem L Zhang, RD Fakhrabadi, M Khoshkhoo, H Salama Preprints
- Multiculturalism H Salama, W Elmannai, C Bach International Journal of Innovation and Scientific Research 3 (2351-8014 ...
- Quantum Dot Solar cells H Salama arXiv preprint arXiv:2211.06898
- Numerical analysis of self-heating effect in HEMT transistors F Nasri, H Mzoughi, H Salama, KA Salama 2023 International Conference on Electrical, Communication and Computer Modeling for CMOS circuit design
- H Salama, A Tshipamba, K Ahmed Device Circuit Co-Design Issues in FETs, 1-20
- Advanced Electrothermal Modeling of Self-Heating in NWFET Transistors Z Guesmi, F Nasri, H Salama, S Missaoui International Journal of High-Speed Electronics and Systems, 2640014
- Elucidation of the Impact of Nano Heat Transfer Variability on Three-Dimensional Field-Effect Transistors F Nasri, H Salama, B Smaani, KA Salama Field Effect Transistors, 477-492

- Nano Thermal Simulation of Graphene Field Effect Transistor Based on Ballistic Diffusive Model F Nasri, H Salama, KA Salama International Journal of High-Speed Electronics and Systems 33 (02n03), 2440067
  - Temperature Effect Assessment on the Gate-All-Around Junction less FET for Bio-Sensing Applications B Smaani, S Labiod, MS Benlatreche, B Mehimmedetsi, R Yadav, International Journal of High-Speed Electronics and Systems 33 (02n03), 2440061
  - Numerical Elucidation of the Electrothermal Characteristics of Gate-All-Around FET Devices F Nasri, H Salama 2023 IEEE 11th International Conference on Systems and Control (ICSC), 01-05
  - Transmission Line Based on The Voltage Stability Control H Salama International Journal of Innovation and Scientific Research 52 (Issue 1), 1–7
  - International Journal of Innovation and Scientific Research ISSN 2351-8014 Vol. 3 No. 2 Jun. 2014, pp. 199-207© 2014 Innovative Space of Scientific Research Journals H Salama, W Elmannai, C Bach
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#### **HONORS AND AWARDS:**

- Obtained 1st position at the Annual Poster competition, in GECO,
  - Fall 2010 scholarship; this is customarily awarded to advanced graduate students in Electrical and Electronic Engineering Department, from the Bani Waled Technical Institute (BTI).
  - Best Operating Engineer Award from Siemens.
  - GECOL Award- National Service 2008.
  - Best Operating Engineer Award from New and Renewable Energy Corporation, Libya and Egypt.
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#### **Teaching**

- Semiconductor Devices and Nanostructures (Spring, 2020 at UCONN)
  - Micro/Opto-electronic Devices and Circuits Fabrication Laboratory (Spring, 2020 at UCONN)
  - Nanoscience and Nanotechnology I (Spring, 2017 at UCONN)
  - Nanotechnology II (Spring, 2018 at UCONN)
  - Fundamentals of Opto-Electronic Devices (Fall 2018 at UCONN)
  - Nanotechnology (Fall 2019 at UCONN)
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