SOUMEN DEB | EE14D036

Indian Institute of Technology Madras

Objective

Obtain a teaching career that utilizes my passion for teaching to create a positive experience for the students and coordinating with other teachers to work on interdisciplinary research areas.

Summary

Currently pursuing Ph.D. in computational and analytical microelectronics, with focus on development of physics based compact model of GaN based **H**igh **E**lectron **M**obility **T**ransistors (HEMT).

Academic Background

Program	Institution	CGPA/%	Year of Completion
Ph.D. in Electrical Engineering	Indian Institute of Technology, Madras, Chennai, India	8.21/10.0	2021 (Expected)
M. Tech in Electronics and Communication Engineering	National Institute of Technology, Silchar, Assam	9.94/10	2014
B. Tech in Electronics and Communication Engineering	National Institute of Technology, Silchar, Assam	7.74/10	2012
XII (Higher Secondary)	Assam Higher Secondary Education Council, Guwahati	76.2%	2006
X (HSLC)	Board of Secondary Education, Assam, Guwahati	78.5%	2004

Coursework

- Advanced CMOS Devices and Technology
- VLSI Technology
- Compound Semiconductors : Properties & Applicaatuon
- MOS Device Modeling and Characterization
- Digital IC Design
- MicroElectroMechanical Systems (MEMS)

Skills

- **Programming languages:** C, C++, Fortran77
- **Software Packages:** Senaturus TCAD, Pspice ORCAD, MATLAB, Coventorware, Comsol Multiphysics

Experience

1. Ph.D. Research scholar Indian Institute of Technology, IIT Madras (July 2014- present)
   Supervisor: Prof. Nandita DasGupta
   - Developed physics based analytical model for breakdown voltage of conventional AlGaN/GaN HEMTs
   - Developing physics based analytical model for breakdown voltage of AlGaN/GaN HEMTs with field plate (FP) structure
   - Developing physics based analytical model for breakdown voltage of AlGaN/GaN HEMTs with AlGaN backbarrier

Projects

1. M.Tech Thesis Project (August 2013- May 2014)
   Supervisor: Prof. Srimanta Baishya
   - Modeling and simulation of a Novel 24-nm DMIDG (**D**ouble **M**etal **I**ndependent **D**ouble **G**ate) MOSFET for low power aplication
   - Designed basic logic gates with the DMIDG MOSFET and shown the reduction in power consumption, as compared to gates made from conventional double gate MOSFETS
2. B.Tech Thesis Project (August 2011- May 2012)
   Supervisor: Prof. Srimanta Baishya
   - MOSFET as a pressure sensor (the PSIGFET, **P**ressure **S**ensitive **I**nsulated **G**ate **F**ield **E**ffect **T**ransistors) : Its mechanical and Electrical properties
   - Developed analytical model for various electrical and mechanical properties of PSIGFET

Publications

Journals

1. **Soumen Deb**, Amitava DasGupta, Nandita DasGupta, "Analytical Modeling for Off-state Lateral Electric Field and Breakdown Voltage of AlGaN/GaN HEMTs," *IEEE Trans. on Electron Devices* (under review)

Conferences

1. **Soumen Deb**, Amitava DasGupta and Nandita DasGupta, "Analytical Modelling of Channel Electric Field of AlGaN/GaN HEMT by Solving 2-D Poisson's Equation", in The International Workshop of The Physics of the Semiconductor Devices, IIT Delhi, 2017.
2. **Soumen Deb**, Amitava DasGupta and Nandita DasGupta, "Analytical Modelling of Peak Lateral Electric Field as a function of Drain Voltage of AlGaN/GaN HEMTs", in International Workshop of Nitride Semicondunctor, IWN'2018, Japan, 2018.
3. **Soumen Deb**, Amitava DasGupta and Nandita DasGupta, "TCAD Simulation Based Study of Effect of Gate Voltage and Barrier Layer Thickness on Off-state Breakdown Voltage of AlGaN/GaN HEMTs", in International Conference on Emerging Electronics, ICEE'2018, India, 2018.
4. **Soumen Deb**, S. Baishya, "TCAD Based Study of a Noble 24 nm DMIDG MOSFET for LOW Power Applications", in IEEE International Conference on Green Computing, Communication and Electrical Engineering, ICGCCEE'14, India, Mar. 6-8, 2014.
5. **Soumen Deb**, S. Baishya, "Modeling and Simulation study of AC Characteristics of an NMOS based High Pressure Sensor", in IEEE International Conference on Green Computing, Communication and Electrical Engineering, ICGCCEE'14, India, Mar. 6-8, 2014.
6. **Soumen Deb**, S. Baishya, "TCAD Based Study of a Noble 24 a Novel 24 nm QW IDG NMOS transistor with ultra-low I_{off}", in IEEE International Conference on Convergence of Technology and Engineering, I2CT'14, India, April. 6-8, 2014.
7. **Soumen Deb**, S. Baishya, "Modeling and Simulation of DC Characteristics of an NMOS based High Pressure Sensor", in IEEE International Conference on Convergence of Technology and Engineering, I2CT'14, India, April. 6-8, 2014.

Award

1. Best poster presentation award in International Conference on Emerging Electronics, ICEE'2018, in the track "Modelling & Simulations".
2. Qualified GATE exam for 4 years, 2011, 2012, 2013, 2014.