I K M REAZ RAHMAN

Ph.D. Candidate at University of California, Berkeley

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EDUCATION

Doctor of Philosophy in Electrical and Electronics Engineering

📅 2021 – 2026 (Expected)   ⚲ UC Berkeley

Master of Science in Electrical and Electronic Engineering

📅 2018 – 2020   ⚲ BUET

CGPA: 3.92/4.00

Bachelor of Science in Electrical and Electronic Engineering

📅 2013 – 2017   ⚲ BUET

CGPA: 3.96/4.00, Position: 5th out of 214 students

Advanced Level, Edexcel

📅 2011 – 2012   ⚲ Maple Leaf International School

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PUBLICATIONS

Journal Articles

Rahman, IKM Reaz, et al. "Low Voltage AC Electroluminescence in Silicon MOS Capacitors." Applied Physics Letters 121.19 (2022): 193502.

https://doi.org/10.1063/5.0120507

Uddin, Shiekh Zia, et al. "Efficiency Roll-Off Free Electroluminescence from Monolayer WSe_2." Nano Letters 22.13 (2022): 5316-5321.

https://doi.org/10.1021/acs.nanolett.2c01311

Rahman, IKM Reaz, Md Irfan Khan, and Quazi DM Khosru. "Analytical drain current and performance evaluation for inversion type InGaAs gate-all-around MOSFET." AIP Advances 11.6 (2021): 065108.

https://doi.org/10.1063/5.0052718

Rahman, IKM Reaz, Md Irfan Khan, and Quazi DM Khosru. "Electrostatic characterization and threshold voltage modeling of inversion type InGaAs gate-all-around MOSFET." Journal of Computational Electronics 20.4 (2021): 1504-1512.

https://doi.org/10.1007/s10825-021-01716-5

Khan, Md Irfan, IKM Reaz Rahman, and Quazi DM Khosru, "Surface potential-based analytical modeling of electrostatic and transport phenomena of GaN nanowire junctionless MOSFET," IEEE Transactions on Electron Devices 67.9 (2020): 3568-3576.

https://doi.org/10.1109/TED.2020.3011645

Rahman, IKM Reaz, Md Irfan Khan, and Quazi DM Khosru. "A rigorous investigation of electrostatic and transport phenomena of GaN double-channel HEMT." IEEE Transactions on Electron Devices 66.7 (2019): 2923-2931.

RESEARCH INTEREST

Electrical and optical measurements of low-dimensional systems and electronic devices with an emphasis on performance enhancement in optoelectronic applications, Simulation and analytical modeling of novel nanodevice and state-of-the-art solid state devices, Nanowire simulation using novel materials.

RESEARCH EXPERIENCE

Electroluminescence in Silicon MOS Capacitors

Supervisor: Prof. Ali Javey, UC Berkeley

- Fabrication of MOS devices in CMOS framework.
- Optical and electrical characterization of device performance metrics.

Gated Photoluminescence in thin film Quantum Dots

Supervisor: Prof. Ali Javey, UC Berkeley

- Optimizing a device structure for gating thin film quantum dots
- Analyzing the various recombination pathways under charge injection

Electrostatic Characterization and Drain Current Modeling of Inversion Type InGaAs Gate-All-Around MOSFET

Supervisor: Dr. Quazi D. M. Khosru, BUET

- Solving quasi 2-D Poisson equation in a continuous manner including interface trap defects, gate voltage correction for short channel effect and inclusion of various non-ideal effects, performance evaluation to scaling metrics.

Analytical Modeling of GaN Nanowire Junctionless MOSFET using surface potential

Supervisor: Dr. Quazi D. M. Khosru, BUET

- Solution of Poisson equation using regional approach, gate voltage correction for short channel effect, inclusion of non-ideal effects and transport analysis.

A Rigorous Investigation of GaN Double Channel MOS-HEMT

Supervisor: Dr. Quazi D. M. Khosru, BUET

- Self-consistent solution of Schrodinger-Poisson equation leading to spatial distribution of carrier density, drain current formulation including inter channel coupling.

TECHNICAL SKILLS

Programming Languages

- Matlab, Verilog, Assembly, C, C++, Latex.

Hardware

- PCB Designing, Circuit Designing, FPGA

Software

- TCAD:Silvaco, Sentaurus Device, Lumerical, Cadence, Arduino IDE, Proteus, PSpice.

PUBLICATIONS

Conference Proceedings

Khan, Md Irfan, IKM Reaz Rahman, and Quazi DM Khosru. "Analytical Modeling of Capacitance-Voltage Characteristics of GaN Nanowire Junctionless MOSFET." 2020 IEEE 20th International Conference on Nanotechnology (IEEE-NANO). IEEE, 2020.
https://doi.org/10.1109/NANO47656.2020.9183461

Rahman, IKM Reaz, et al. "Analytical modeling of electrostatic characteristics of enhancement mode GaN double channel HEMT." 2018 IEEE 13th Nanotechnology Materials and Devices Conference (NMDC). IEEE, 2018.
https://doi.org/10.1109/NMDC.2018.8605851

WORK EXPERIENCE

Assistant Professor

📅 2021–Present (On Leave)   📍 BUET
Department of Electrical and Electronic Engineering

Lecturer

📅 2018–2021   📍 BUET
Department of Electrical and Electronic Engineering

Educational and Outreach Coordinator

📅 2019–2021   📍 IEEE
IEEE ED/SSCS Bangladesh Chapter

RELEVANT COURSEWORK

Graduate Courses (UC Berkeley)

- Integrated-Circuit Devices (EE230A), Introduction to Optical Engineering (EE218A), Lightwave Devices (EE232), Introduction to Microelectromechanical Systems (EE247A)

Undergraduate Courses

- Solid State Devices, Compound Semiconductor and Heterojunction Devices, Semiconductor Device Theory, MOS Devices, Optoelectronics, Power Electronics, Control Systems, Electronics (I + II), Energy Conversion, VLSI, Microprocessor and Interfacing, Measurement and Instrumentation, Communication Theory, Digital Signal Processing