

IKM REAZ RAHMAN

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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. "Gate Controlled Excitonic Emission in Quantum Dot Thin Films." *Nano Letters* 23.22 (2023): 10164-10170.

<https://doi.org/10.1021/acs.nanolett.3c02456>

Higashitarumizu, Naoki, et al. "Anomalous thickness dependence of photoluminescence quantum yield in black phosphorous." *Nature Nanotechnology* 18.5 (2023): 507-513.

<https://doi.org/10.1038/s41565-023-01335-0>

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 WSe₂." *Nano Letters* 22.13 (2022): 5316-5321.

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

Rahman, IKM Reaz, Khan, Md Irfan, and Khosru, Quazi DM. "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, Khan, Md Irfan, and Khosru, Quazi DM. "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, Rahman, IKM Reaz, and Khosru, Quazi DM, "Surface potential-based analytical modeling of electrostatic

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

Performance limits of tellurium based semiconductors

Supervisor: Prof. Ali Javey, UC Berkeley

- Exploring thermally stable contacts to tellurium for back end of the line integration to CMOS technology
- Probing the performance of tellurium transistors in nanoscale

Gated Photoluminescence in Quantum Dot Thin Films

Supervisor: Prof. Ali Javey, UC Berkeley

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

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.

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.

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

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

TECHNICAL SKILLS

Programming Languages

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

Hardware

- PCB Designing, Circuit Designing, FPGA

Software

- TCAD:Sentaurus Device, Lumerical,Arduino

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