Khush Gohel

University of Wisconsin Madison
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Education

University of Wisconsin-Madison **Sept 22 - Aug 24 *Expected***
Master of Science in Electrical and Computer Engineering *CGPA: 3.571/4*

BITS Pilani Hyderabad Campus **Aug 17 - Aug 21**
Bachelor of Engineering in Electrical and Electronics *CGPA: 8.04/10*

Technical Skills

- **Fabrication techniques known:** MOCVD, Photo-lithography, Thermal Evaporation, 3D Printing, Direct UV Laser writing, CO2 Laser engraving, Soft lithography, Spin Coating
- **Characterization Skills:** Atomic Force Microscopy, X-Ray Diffraction, Scanning Electron Microscopy, UV-Visible Spectroscopy, PL spectroscopy, Impact and Tensile Testing, Cyclic Voltammetry, Galvanostatic Charge Discharge
- **Software:** Atlas Silvaco TCAD, Origin, Xilinx ISE, LT Spice, Vivado, Simulink, Fusion 360, AutoCAD, Adobe (Illustrator, Photoshop, Premiere Pro, Aftereffects)
- **Programming languages:** C/C++, Python, System Verilog, Verilog, x86 Assembly language

Work Experience

Teaching Assistant (ECE 342: Electronic circuits 2) **Jan 23 - May 23**
UW-Madison, Department of ECE *Madison, WI*

- Tutoring an undergraduate level electronics circuits course with a student strength of 66 taught in a flip class methodology.

System Validation Engineer (Intel Data Center Group) **Oct 21 - July 22**
Intel DCG - Memory Subsystem *Bengaluru, India*

- Developed more than 100 test cases to stress DRAM, High Bandwidth memory, and Persistent Memory to mimic memory operations often performed by data center systems using industry-standard workloads like SAP-HANA.
- Performed a system-level memory performance analysis using the Intel VTune profiler for diverse test cases to document important performance metrics allowing other validation engineers in the team to understand their workload more efficiently and quickly.

Research Experience

Wide-Bandgap Materials and Devices Lab **Sept 22 - Present**
Graduate Research Assistant (Supervisor: Prof. Shubhra Pasayat, Prof. Chirag Gupta) *Madison, USA*

- **III-Nitride High Electron Mobility Transistors(HEMTs)**
  - Performed TCAD simulations to reduce Self Heating Effects in AlGaN/GaN HEMT at high output power (40W/mm) by integrating peripheral Diamond Heat Spreaders for multi-way heat extraction.
  - Performing research on the growth of III-Nitrides via Metal Organic Chemical Vapour Deposition (MOCVD) and its hetero-junctions for improving HEMT device DC and AC performance.
- **High Pressure confined Chemical Vapor Deposition(HPcCVD)**
  - Build an HPcCVD system from the ground up for conformal deposition of amorphous Si for photonics application.
  - Created system flow diagrams and standard operating procedures for other users to get acquainted with the system.

MEMS Microfluidics and Nanoelectronics Lab **Jun 21 - Jul 21**
Research Assistant (Supervisor: Prof. Sanket Goel) *Hyderabad, India*

- **Laser Induced Graphene (LIG) Devices**
  - Optimized laser ablation parameters to obtain LIG on Polyimide and paper substrate for its utilization for strain sensing and supercapacitor applications.
  - Studied charge storing mechanisms in super-capacitors and its relation with LIG electrode morphology via electrochemical characterizations.
  - Fabricated LIG strain sensor by using clean-room free fabrication techniques and investigated LIG sensing mechanism based on its morphology and electrical characteristics.

Flexible and Wearable Nanoelectronic Devices Research Group **Aug 19 - May 20, Jan 21 - May 21**
Undergraduate Research Assistant (Supervisor: Dr. Parikshit Sahatiya) *Hyderabad, India*

- **Novel hybrid 2D nanomaterial memristor**
  - Utilized 2D materials Transition Metal Chalcogenide SnS and Mxene Ti3C2 as active materials synthesized by facile single step solvothermal and MAX phase etching method, respectively.
- **Low-Cost Eraser based Multi-functional sensor**
  - Fabricated a fully functional, flexible and biodegradable multi-functional (breath and strain) sensor using clean-room-free fabrication techniques.
  - Synthesized 2D nanomaterial MoS2 a Transition Metal Dichalcogenide(TMD) by two-step hydro-thermal synthesis on an eraser substrate and utilized it for simultaneous strain and breath sensing using machine learning classification algorithm.

Projects

- **8-bit Pipelined Processor Design based on RISC V architecture:** Simulated a 4-stage pipelined processor with an Instruction fetch Unit, Register file, Execution unit(ALU), and write-back stage along with Data hazard detection and forwarding unit to overcome data hazard for Add, jump, and mov instructions.
- **Wireless UART Communication between FPGA and Mobile:** As a part of the Bachelor's course group project for the course FPGA Laboratory, UART communication protocol was implemented on the Zedboard Zynq-7000 (FPGA) connected to bluetooth module HC-05 which is wirelessly communicating with a mobile application.
- **Implementation of DCM DC-DC Converters for piezoelectric harvesters based on research papers:** As a part of the Bachelor's course group project for the course Power Electronics, Springer paper "DCM Boost Converter in CPM Operation for Tuning Piezoelectric Energy Harvesters" was taken as reference for simulation in the MATLAB Simulink.

Publications

1. **A Water-Soluble Micropatterned MoS2QDs/PVA Film as a Transient Contact (Pressure) and Non-Contact (Humidity) as Touch and Proximity Sensor**
   N. Bokka, **K. Gohel**, P. Sahatiya
   Presented at IEEE 21th International Conference on Nanotechnology (IEEE-NANO21)
   Accepted in Journal of Applied Polymer Science (Wiley), doi: 10.1002/app.51711

2. **MoS2 based Multifunctional sensor for both Chemical and Physical Stimuli and their Classification using Machine Learning Algorithms**
   V. Selamneni*, **K. Gohel***, N. Bokka, S. Sharma, P. Sahatiya (*first author with equal contribution)
   Accepted in IEEE Sensors, doi: 10.1109/JSEN.2020.3023309

3. **Graphenized papertronic devices using Blue laser ablated Polyimide resin**
   S. Pavar, **K. Gohel**, S. Goel
   Accepted in IEEE Nanotechnology Materials and Devices Conference 2021, doi:10.1109/NMDC50713.2021.9677540

4. **Demonstration of a 2D SnS/MXene Asymmetric Nanohybrid Memristor**
   S. Saha, V. Adepu, **K. Gohel**, P. Sahatiya, S. Dan
   Poster Presentation in International Workshop on the Physics of Semiconductor Devices (IWPSD 2021)
   Accepted in IEEE Transactions on Electron Devices,early access link

5. **Three Different Rapidly Prototyped Polymeric Substrates with Interdigitated Electrodes for Escherichia coli Sensing: A Comparative Study**
   M. Rishi, K. Amreen, **K. Gohel**, A. Javed, S. Dubey, S. Goel
   Accepted in IEEE Transactions on NanoBioscience, doi:10.1109/TNB.2022.3190290

Relevant Coursework

- Advanced Electronic Devices*
- Photonics*
- Optics & Optoelectronics
- Electronic Devices
- Integrated Circuit Design
- Micro-Electronic Circuits
- Analog Electronics
- Digital Design
- Analog and Digital VLSI
- Computer Architecture
- Thin Film Technology
- Micro Electro Mechanical Systems

Position of Responsibility

VFx Club **Jul 18 - May 19**
Joint Secratary *Hyderabad, India*

- Managed multiple VFx Club events at the BITS Hyderabad cultural festival Pearl 2019, which drew over 40 participants. Conducted workshops on camera handling and video editing software with over 120 students in participation.