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: 3.77/4*

Relevant Coursework: *Solid State Electronics*, Digital Circuits and Components*, Advanced Electronic Devices, Integrated Circuit Design, Photonics, Optics & Optoelectronics (* in progress)*

BITS Pilani Hyderabad Campus   Aug 17 - Aug 21

Bachelor of Engineering in Electrical and Electronics   *CGPA: 8.04/10*

Relevant Coursework: *Electronic Devices, Micro-Electronic Circuits, Analog Electronics, Digital Design, Analog and Digital VLSI, Computer Architecture, Thin Film Technology, Micro Electro Mechanical Systems*

Skills

- **Technical Skills:** CVD systems, Photolithography, Metal Thermal Evaporation, 3D Printing, Direct UV Laser writing (20 um), CO2 Laser engraving, Soft-lithography
- **Characterization Skills:** Atomic Force Microscopy, X-Ray Diffraction, Scanning Electron Microscopy, Hall and CV measurements, IV measurements, Small Signal measurements
- **Software & Programming languages:** Atlas Silvaco TCAD, OriginLAB, Xilinx ISE, LT Spice, Vivado, Simulink, Fusion 360, AutoCAD, C, Python, System Verilog, Verilog, x86 Assembly language
- **Soft Skills:** Collaboration, Critical thinking, Attention to Detail, Presentation and Publishing, Communication

Research Experience

Wide-Bandgap Materials and Devices Lab   Sept 22 - Present

Graduate Research Assistant (Supervisor: Prof. Shubhra Pasayat & Prof. Chirag Gupta)   *Madison, USA*

- **High Pressure confined Chemical Vapor Deposition(HPcCVD)**
- Examined the heterogeneous and homogeneous reaction kinetics involved in the 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.

- **III-Nitride High Electron Mobility Transistors(HEMTs) Simulation and Electrical Characterization**
- Studied device physics and design of HEMTs, performed various electrical characterizations like Hall measurements, CV Measurements, IV, and S-parameter characterizations.
- 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.
- Studied MOCVD growth technique and kinetics in-depth to understand the epitaxial structure of III-N devices.

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.
- 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 21

Undergraduate Research Assistant (Supervisor: Prof. Praikshit 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.
- Performed Electrode and active material deposition using thermal evaporation and spin coating, respectively, to successfully build a unique SnS/MXene memristor.

- **Micropatterned Transient humidity and pressure sensor using MoS2 Quantum Dots (QDs)**
- Fabricated flexible pressure and humidity sensor using MoS2 QDs and Poly Vinyl Alcohol (PVA) showing water triggered transiency of 180 seconds.
- Micro-patterned the device surface using CO_2 laser etched PDMS mould to improve the sensor sensitivity.
- Researched on QD/polymer structures and Quantum effects like coulomb blockade, and Energy band bending to provide conduction mechanism inside the sensor.

- **Low-Cost MoS2 Multi-functional Sensor on Eraser Substrate.**
- 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.

Work Experience

UW-Madison Department of ECE <div align="right">Jan 23 - May 23</div>

Teaching Assistant <div align="right">*Madison, WI*</div>
- *ECE 342-Electronic Circuits 2 (Spring'23, fall'23):* Tutored an undergraduate-level electronics circuits course taught in a flip class methodology with a student strength more than 60.
- *ECE 210-Introductory Experience to Electrical Engineering (fall'23):* Tutoring an undergraduate-level lab course with class strength more than 20.

Intel <div align="right">Oct 21 - July 22</div>

System Validation Engineer <div align="right">*Bengaluru, India*</div>
- Studied state-of-the-art server architecture and memory architecture for Intel Xeon Processor segment to perform a platform-level pre-silicon and post-silicon validation.
- Developed 100+ scalable test cases stressing DRAM, HBM, and Persistent Memory technology for data center systems using industry-standard workloads like SAP-HANA and Instruction Latency Checker.
- Strategized and attempted to standardize a system-level memory performance analysis using the Intel VTune profiler for diverse Memory stressing test cases allowing other team members to save weeks required to understand their workload and increase team efficiency.

Publications and Presentations

1. **Understanding of Multi-way Heat Extraction Using Peripheral Diamond in AlGaN/GaN HEMT by Electrothermal Simulations.**
   Khush Gohel, Lin Hui Zhou, Swarnav Mukhopadhyay, Shubhra S Pasayat, Chirag Gupta
   Presented at Electronic Materials Conference 2023 (MRS-EMC'23)

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. **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

4. **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

5. **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

6. **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