ARMAN RYAN MEHZAD

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EDUCATION

The Ohio State University — Aug 2024 - May 2026 (expected)
M.S. in Electrical and Computer Engineering — GPA: 3.87/4.00

The Ohio State University — Aug 2021 - May 2025
B.S. in Electrical and Computer Engineering — GPA: 3.73/4.00

RESEARCH INTERESTS

Bioelectronics, Semiconductor Physics, Microfabrication, Neural Engineering, Biosensing, Organic Electronics

RESEARCH EXPERIENCE

AlGaN/GaN Transistor-Based Biosensors — Aug 2024 - Present
Advisor: Dr. Wu Lu — The Ohio State University

- Investigating high-electron mobility transistor (HEMT)-based sensors for the detection of biomarkers in solution, specifically toxin (MC-LR) in lake water & neurological biomarkers (BDNF, Nf-L) in physiological buffer solution.
- Utilized microfabrication techniques (ICP etching, E-beam physical vapor deposition, photolithography, etc.) to make biosensors. Developed processes for SU-8 photoresist spin-coating, UV μMLA exposure, and development.
- Characterized transistors before, after, and during the application of a solution containing a biomarker. Conducted IV, CV, transfer, gate diode, & other measurements on transistors.
- Developing a comprehensive Python package for the automated analysis and visualization of semiconductor device measurements from Keithley 4000S Parameter Analyzers.
- Conducted extensive literature reviews on HEMT-based biosensors & biomarkers of disease.
- Designed biosensor device layouts in KLayout.

Low-Intensity Focused Ultrasound Neuromodulation [1] — Aug 2023 - Present
Advisor: Dr. Luan Phan — The Ohio State University

- Worked as part of a team investigating the impacts of non-invasive low-intensity focused ultrasound (LIFU) neuromodulation of the amygdala with fMRI in healthy human subjects.
- Utilized Python to determine regions of interest where functional activation in response to the Emotional Face Assessment Task (EFAT) was significantly altered post-procedure.
- Documenting & streamlining fMRI data preprocessing pipeline for future studies.
- Processed fMRI data from clinical trial using SPM & MarsBaR.

Near-Infrared Transcranial Photobiomodulation — Aug 2022 - Jan 2024
Advisor: Dr. Sanjay Krishna — The Ohio State University

- Worked as part of a team investigating the impact of transcranial photobiomodulation (tPBM) on EEG & fMRI.
- Collected transmittance & reflectance measurements from skull & neuronal tissue phantoms illuminated by near-infrared (NIR) lasers to evaluate the efficacy of non-invasive deep brain stimulation.
- Proposed study to investigate impact of tPBM on EEG recordings of P300 & SSVEP signals in human subjects.
- Programmed software for providing visual stimulus to invoking P300 & SSVEP signals during experiment.
- Wrote & submitted IRB proposal for study with healthy human subjects.

PUBLICATIONS

[1] K. Jenkins, K. Koning, **Arman Mehzad**, *et al.*, "Low-Intensity Transcranial Focused Ultrasound of the Amygdala Modulates Neural Activity During Emotion Processing," *Frontiers in Neuroimaging*, 2025. [Online]. Available: https://doi.org/10.3389/fnimg.2025.1580623.

PROFESSIONAL EXPERIENCE

Computed Tomography (CT) & X-Ray Inspection Engineering Intern — May 2025 - Aug 2025
GE Aerospace, Aerospace Inspection Solutions (AIS) Laboratory — Cincinnati, OH

- Developed Python script to monitor CT scanner health, predict detector failure, and visualize degradation trends.
- Modernized real-time detector analytics dashboards to support new software, improved the user interface, and improved backend script efficiency utilizing Python data visualization packages and automated PowerShell scripts.

- Replaced legacy PowerShell scripts with Python scripts to automate scanned part reporting for new part analysis software, ensuring continuous and consistent report generation between software switches.

ECE 5031 Student Grader Jan 2025 - May 2025
The Ohio State University, College of Engineering Columbus, OH

- Grader for Dr. Wu Lu's ECE 5031 - 'Semiconductor Process Technology' during the SP25 semester.
- Instructed students on Silvaco Athena semiconductor process and fabrication simulations.
- Created solution manuals for assignments (homework, projects, and quizzes).

Student Research Assistant Aug 2021 - Aug 2023
UES, Inc. (Now BlueHalo) Dayton, OH

- Developed Python scripts to automate data processing pipelines in a Google Cloud environment.
- Developed C++/Python scripts to backup server files & metadata, as well as to log server activity.
- Organized and categorized thousands of large genetic datafiles for computational genomics research.

PROJECTS

Feasibility of 2D Material as Base in GaN NPN HBT Spring 2025

- Utilized TCAD software (Silvaco) to simulate and evaluate the feasibility and function of a GaN-MoS_2 NPN heterojunction bipolar transistors (HBTs).
- Evaluated variation in IV characteristics, transistor gain, breakdown, and more with varying design parameters.
- Programmed an analytical model to estimate theoretical cutoff & oscillation frequency of device.

Machine Learning for Classification of Seizure Severity in Mice Aug 2024 - May 2025

- Led a capstone team to develop a machine learning model for researchers to quickly process and accurately determine the severity of seizures in mice via behavioral data from BSOiD (a movement classification software).
- Assisted with the design of a web-based GUI for easy upload of data & access to predicted seizure severity scores.
- Developed a random forest model utilizing Scikit-learn achieving an accuracy of 92.94% and precision of 94.91%.
- GUI & random forest model dramatically decreased time of behavioral data analysis in collaborating laboratory, which previously had been done manually by volunteers who had required substantial training.

RELEVANT COURSEWORK

Expected / In Progress:

ECE 6531 - Semiconductor Optoelectronic Devices	Spring 2026
MATSCEN 5651 - Biomaterials Processing	Spring 2026
ECE 7032 - Physical Electronics of Advanced Semiconductor Devices	Autumn 2025
ECE 5020 - Mixed Signal VLSI	Autumn 2025
BIOMEDE 5610 - Advanced Biomedical Micro/Nanotechnologies	Autumn 2025
PHYSICS 7501/7502 - Quantum Mechanics I/II	Autumn 2025 / Spring 2026

Completed:

ECE 5530/6531 - Fundamentals of Semiconductors I/II	Autumn 2024 / Spring 2025
ECE 5833 - Organic and Flexible Electronics	Spring 2025
BIOMEDE 5635 - Cellular Nanotechnology	Spring 2025
ECE 5037 - Solid State Electronics and Photonics Lab	Autumn 2024
ECE 5033 - Surfaces and Interfaces of Electronic Materials	Spring 2024
ECE 5031 - Semiconductor Process Technology	Spring 2024

ACHIEVEMENTS

Dean's List, College of Engineering *All Semesters*

SKILLS

Microfabrication Techniques	ICP-RIE, E-Beam PVD, Spin-Coating, Photolithography
Programming Languages	Python, C/C++, MATLAB, PowerShell
Python Packages	Matplotlib, Pandas, Numpy, Plotly
Software Tools	Silvaco, GitHub, LaTeX, KLayout