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 toxins (MC-LR) in lake water & neurological biomarkers (BDNF, Nf-L) in physiological buffer solution.
- Utilized microfabrication techniques (reactive ion etching, E-beam physical vapor deposition, photolithography) to make biosensors. Developed process 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 invoke 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 new scripts to automate scanned part reporting for new part analysis software, ensuring continuous and consistent report generation between software switches.
- Performed CT scans of parts under the supervision of non-destructive testing (NDT) engineers.

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 the theoretical cutoff & maximum oscillation frequencies 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 5131 - Lasers	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