

Rana Talha Khalid

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Objective

Recent Biomedical Engineering graduate from Riphah International University with a CGPA of 3.77/4.00, passionate about transforming healthcare through innovative AI-powered diagnostic tools. Specializing in biodevice design, biosensors, and deep learning, I aim to collaborate with industry leaders to develop reliable, data-driven solutions for early disease detection, leveraging my expertise to meet global healthcare standards.

Education

Riphah International University, Lahore, Pakistan

10/2021 to 6/2025

- Bachelor of Sciences in Biomedical Engineering
- CGPA: 3.77/4.00

IELTS Score: 7 Bands Overall

Experience

Lab Engineer at Riphah International University

10/2025 to Present

- Conduct lab sessions and experiments, guiding students through hands-on activities to reinforce engineering concepts and ensure safe, effective use of laboratory equipment.
- Perform administrative tasks, and supervise student projects, providing technical support and troubleshooting assistance during practical assignments.

Undergrad Research Assistant at Biosensors Lab

5/2024 to 6/2025

- Worked on Modeling and Simulation of Hydrogel-based Heart Rate sensors using COMSOL Multiphysics.
- Developed a hybrid AI model (Transformer + CNN) using TensorFlow for ECG classification, achieving 92% accuracy.

Biomedical Trainee at ENDOKARE, Pakistan

8/2024 to 9/2024

- Worked on endoscopic systems focusing on CCD and CMOS sensors for real-time imaging.
- Assisted in preparing technical documentation and client-facing PowerPoint presentations.

Biomedical Trainee at Doctors Hospital and Medical Centre, Lahore

8/2023 to 9/2023

- Analyzed operational principles of cardiac monitors, ventilators, and MRI systems.
- Assisted in regulatory compliance and audit during the Punjab Healthcare Commission visit.

Publications

- **Title:** Advances in Polyvinylidene Fluoride (PVDF) for Self-Powered Wearable Physiological Monitoring and Energy Harvesting Applications
Journal: Nano Energy **Authorship:** Co – First Author
Impact Factor: 16.8 (Q1)
DOI: [10.1016/j.nanoen.2025.111296](https://doi.org/10.1016/j.nanoen.2025.111296)
- **Title:** Reshaping the Healthcare world by AI-integrated wearable sensors following COVID-19
Journal: Chemical Engineering Journal **Authorship:** Co – First Author
Impact Factor: 13.4 (Q1)
DOI: [10.1016/j.cej.2025.159478](https://doi.org/10.1016/j.cej.2025.159478)
- **Title:** Electrospun Nanofibers for Wearable Cardiovascular Health Monitoring
Journal: Journal of Science: Advanced Materials and Devices **Authorship:** Co – First Author
Impact Factor: 6.7 (Q1)
DOI: [10.1016/j.jsamd.2025.101030](https://doi.org/10.1016/j.jsamd.2025.101030)
- **Title:** Next-generation wearable ECG systems: Soft materials, AI integration, and personalized healthcare applications
Journal: Chemical Engineering Journal **Authorship:** Co – First Author
Impact Factor: 13.4 (Q1)
DOI: [10.1016/j.cej.2025.170117](https://doi.org/10.1016/j.cej.2025.170117)
- **Title:** Hybrid Sensor Integration in Wearable Devices for Improved Cardiovascular Health Monitoring
Journal: Journal of Science: Advanced Materials and Devices **Authorship:** 4th Author
Impact Factor: 6.7 (Q1)
DOI: [10.1016/j.jsamd.2025.100889](https://doi.org/10.1016/j.jsamd.2025.100889)
- **Title:** A Semi-Automated Framework for Standardized Vertebral Measurement with Enhanced Reproducibility in Lumbar Spine MRI Analysis
Journal: Material Proceedings **Authorship:** Co – First Author
Proceedings Paper
DOI: [10.3390/materproc2025023005](https://doi.org/10.3390/materproc2025023005)

Skills

- **Material processing:** COMSOL Multiphysics (for material behavior simulation), Thermal analysis, and Material Degradation analysis.
- **3D Model Design:** SolidWorks, SketchUp
- **Circuit Design & Simulation:** Multisim, EasyEDA PCB designing, Proteus
- **Mathematical Modeling & Simulation:** COMSOL Multiphysics, LabView, MATLAB, Python
- **Microcontrollers:** Arduino, Raspberry Pi, PIC 18
- **Development:** Mobile App Development using Flutter, Dart, C++, C#, Python (TensorFlow, Pytorch)
- **Artificial Intelligence:** Deep Neural Networks for biosignals and bioimaging, Machine Learning for device optimization, Custom AI model development using TensorFlow and PyTorch, Biosignal processing with feature extraction and wavelet denoising.

Projects

Final Year Design Project: Developed a compact handheld device capturing echocardiograms, phonocardiograms, and respiratory auscultations to classify disease using a Hybrid LSTM-CNN network (AUC >97%) for early cardiopulmonary disease detection and real-time arrhythmia alerts.

Course Projects:

- **PVA Hydrogel-based Heart Rate Model:** Modeling and Simulation of Hydrogel-based Heart Rate sensor using COMSOL Multiphysics
- **CardioRespiAnalyzer:** Created a MATLAB app for cardiovascular and respiratory audio analysis.
- **Gesture-Controlled Robotic Arm:** Built a micro-servo arm using MPU6050 sensor.
- **Hand Band:** Designed a gyro/accelerometer-based device for upper limb biomechanics in sports.
- **Hepatic Cancer Therapy Model:** Modeled multimodal therapy with COMSOL

Additional Courses

- **Machine Learning Specialization** by DeepLearning.ai and Stanford (2025):
 - Supervised Machine Learning: Regression and Classification
 - Advanced Learning Algorithms
 - Unsupervised Learning, Recommenders, Reinforcement Learning
- **Cancer Biology Specialization** by Johns Hopkins University (2025):
 - Introduction to the Biology of Cancer
 - Understanding Cancer Metastasis
 - Understanding Prostate Cancer
- Healthcare Data Literacy by University of California (2023)
- Foundations of Healthcare Systems Engineering by Johns Hopkins University (2023)
- How to Write and Publish a Scientific Paper (Project-Centered Course) by École Polytechnique (2023)
- MATLAB Onramp by Mathworks (2023)
- App Building Onramp by Mathworks (2023)

Awards

- 1st Runner-Up position at ETECTE'23 (2nd International Conference on Emerging Trends in Electrical, Control and Telecommunication Engineering) for poster presentation on "Use of AI-Enhanced Wearable Sensors for Cardiac Parameter Analysis in COVID-19 Patients"
- Mukhawat Scholarship (50% Tuition Fee Coverage) awarded based on maintaining CGPA above 3.50/4.00
- Tameer Scholarship (100% to 75% Tuition Fee Coverage) awarded based on 1st and 2nd position in final exams, respectively
- Forward-Thinking Pioneer Award (RSES)
- Mentorship Excellence Award (RSES)

Leadership

Technical Team Lead/Founding Member, Riphah Society of Engineering and Sciences (RSES), Riphah International University, Pakistan (3/2023 to Present):

- Co-founded the society to facilitate technical sessions and interactive events for hands-on experience with emerging technologies
- Organized 3 industry engagement activities and over 8 detailed workshops on emerging tools and technologies, connecting students with leading professionals to bridge the gap between academia and industry

Volunteer and Extracurricular Activities

- Volunteered at 34 **blood donation drives** organized by blood donation society and Al-Khidmat Foundation
 - Won 2 **debate competitions:** Developed strong public speaking and argumentation skills.
 - **Member of Al-Khidmat Foundation:** participated in many charity events as a volunteer such as iftar drives, clean environment drives and blood donation events.
 - Member of **Crisis Text Line**
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