

# 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:** 4<sup>th</sup> 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.

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## 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

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## 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)

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## 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)

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## 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

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## 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**