

# FIZZA RUBAB

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## EDUCATION

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### Habib University

Aug 2019 - May 2023

BS Computer Science - Double Minor in Electrical Engineering and Mathematics

Karachi, PK

- **CGPA: 3.99/4.00, Rank: 1/114**
- BS Thesis: Prompt Emergency Response-PLSP Mobile Application for Effective Cardiac Arrest and Trauma Management in Pakistan

### Bentley University

Jun 2023 - Jul 2023

Wolfram Summer School - Research based Educational Program

Waltham, US

- Research Project: 3-Dimensional Human Pose Estimation
- Supervised by Dr. Stephen Wolfram and Miss Maria Sarsgyan

## EXPERIENCE

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### Xu Lab, Computational Biology Department, Carnegie Mellon University

Aug 2023 - Present

Research Intern

Remote

- Supervised by Dr. Xueying Zhan, Dr. Xingjian Li and Prof. Min Xu
- Improved particle picking algorithm with a localized DoG method, resulting in a 96% particle detection rate
- Exploring pointnet based architectures for cryo-ET subtomogram classification through surface point cloud representation
- Currently investigating image denoising through data-dependent diffusion models

### Farmevo

Aug 2023 - Present

Machine Learning Engineer

Karachi, PK

- Used State-of-Art Detectors (YoloV8, DeTR, MaskRCNN) to improve crop detection on drone images of the field
- Implemented a semi-supervised auto-labelling pipeline for Banana detection which improved accuracy by +15%
- Developed gap filling prescription algorithm which identified gaps in row crops upto 85% accurately in dense fields

### Empathic Computing Laboratory, University of Auckland

Dec 2022 - Aug 2023

Virtual Research Intern

Remote

- Supervised by Mr. Ted Ahmadi and Dr. Mark Billinghurst
- Worked on the project, 'Neurophysiological Measures of the Working Memory', to predict cognitive load from EEG, HR, GSR, and Pupil dilation data cues from VR game experiments. Achieved 71% accuracy using ML Classifiers

### Stanford University

May 2023 - Jun 2023

Instructor/Section Leader for CS106-A

Remote

- Selected 1 out of 11 from Pakistan to teach Code in Place course in affiliation with Stanford University
- Led engaging weekly Python programming sessions over zoom for a diverse group of students

### Center for Cell Analysis and Modeling, University of Connecticut Health

Jun 2022 - May 2023

Google Summer of Code Contributor

Remote

- Supervised by Dr. Pedro Mendes and Dr. Hasan Baig
- Designed an improved version of the Cloud COPASI, streamlining HPC job submissions of biological models without SSH configurations.
- Implemented feature to create COPASI pools on AWS Cloud for non-HPC affiliated users
- Contributed to Cloud COPASI's manuscript to be submitted in a reputed system biology's journal

### Aks IQ - Smart Trade Solutions

Dec 2022 - May 2023

Associate Software Engineer

Karachi, PK

- Developed a video editor with AI transcripts using State of Art Text-to-Speech models
- Developed intelligent product description retrieval system using transformer based query description embeddings
- Created Doc iQ, a business centric OCR solution to extract structured data from receipts, transactions and cheques

### Securiti

Jun 2022 - Jul 2022

Backend Software Intern

Karachi, PK

- Developed a Logfile Analyzer using SVM model for classification of any textual content into logs or non logs
- Designed Regex merger algorithm for streamlined postal code extraction
- Developed MS Office documents data extractor utility using Apache POI for data retrieval

## PUBLICATIONS

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1. **F. Rubab**, S. Hafeez, M. H. Qazi, M. H. Syed, B. I. Azeemi and A. J. Kayani, "A Comparative Survey of Solutions to Russel's Paradox," in 4th International Conference on Computing, Mathematics and Engineering Technologies (ICOMET), 2023
2. I. Siddiqui, **F. Rubab**, H. Siddiqui and A. Samad, "Poet Attribution of Urdu Ghazals using Deep Learning," in 3rd International Conference on Artificial Intelligence (ICAI), 2023
3. S. Hafeez, S. Pervez, R. Naeem, **F. Rubab** and S. Raza, "Prompt Emergency Response: PLSP Mobile Application for Effective Cardiac Arrest and Trauma Management in Pakistan" in 13th IEEE Global Humanitarian Technology Conference (GHTC), 2023



## AWARDS AND HONORS

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<b>Chancellor's Yohsin Medal</b> For graduating with highest honor of excellent academics and metacurriculars	<b>Habib University, 2023</b>
<b>Dean's Medal</b> For graduating with the highest CGPA in Computer Science Program	<b>Habib University, 2023</b>
<b>Best Research Award</b> For producing the best research publication in Computer Science	<b>Habib University, 2023</b>
<b>Best Khidmat (Volunteer) Award</b> For conducting most impactful volunteer work using Computer Science skills	<b>Habib University, 2023</b>
<b>Dean's Honor List</b> For being one of the top 10% students in the program each semester	<b>Habib University, 2020-2022</b>
<b>President's Honor List</b> For maintaining position on Dean's Honor List in consecutive semesters	<b>Habib University, 2021-2022</b>
<b>High Academic Achievement Scholarship</b> Additional 10% Scholarship for the Top 3 students in the school each semester	<b>Habib University, 2020-2023</b>
<b>2nd Position in Speed Programming, CyberSecurity Hackathon</b> Awarded by president of Pakistan for securing first runner up position in speed programming	<b>Ignite, 2021</b>
<b>Bronze Medalist in ICPC Regionals</b> For excellent performance in International Collegiate Programming Contest, Topi Regionals	<b>ICPC, 2022</b>
<b>HU-TOPS Merit Scholarship</b> 100% scholarship for four years awarded to top 50 students from all over Pakistan	<b>Habib University, 2019-2023</b>
<b>First Position in National Examinations</b> Securing highest grade nationwide with distinctions in mathematics and chemistry	<b>AKUEB, 2019</b>

## RELEVANT PROJECTS

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<b>Cryo-ET Subtomogram Classification using Point Clouds</b> • Modeled Cryo-ET subtomograms as surface point clouds using marching cubes algorithm, trained PointNet classifier on simulated data, and currently exploring custom U-Net based architectures for improved accuracy.	<b>Sep 2023 - Present</b>
<b>3D Human Pose Estimation using Machine Learning</b>  • Implemented pose estimation in 3D for images and videos in the wolfram language by fusing a 2D pose estimation network, CenterNet, with MiDas, a variation sensitive monocular depth estimation network.	<b>Jun 2023 - Jul 2023</b>
<b>Poet Attribution of Urdu Poetry</b>  • Assembled a dataset of around 17000 couplets from 15 different poets and implemented various sequence models, RNN, GRUs and LSTMs for classification. 81% accuracy was achieved by fine-tuning a multilingual Bert transformer	<b>Aug 2022 - Dec 2022</b>

## ACADEMIC SERVICES

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- **Teaching Assistant at Habib University for 5 courses:** Natural Language Processing, Linear Algebra, Nature of Computation, Discrete Mathematics, Object Oriented Programming and Computer Science Freshman Seminar
- **Programming Fundamentals Workshop facilitator** for incoming computer science class of 2025, Habib University
- **Programming Bootcamp Instructor** for middle school students at Aga Khan School, Garden

## SKILLS

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**Programming:** Python, C/C++, Java, MATLAB, C#, Mathematica  
**ML Tools:** Pandas, Numpy, Scikit-Learn, Tensorflow/Keras, OpenCV, Pytorch, Onnx  
**Developer Tools:** Django, Flask, Flutter, React  
**Languages:** English, Urdu