# OSAMA ABU HAMDAN

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## PROFESSIONAL EXPERIENCE

**High Performance Computing Lab**                                                                **Arlington, TX, USA**
*Research Assistant*                                                                                      *August 2021 - Present*
- Conduct research on Software-Defined Networking (SDN) to optimize performance for Federated Learning applications.
- Integrate and utilize tools such as Mininet, ONOS, Open vSwitch (OVS), and NFV to enhance network scalability.
- Develop SDN-based dynamic routing solutions to reduce latency and improve communication in distributed AI systems.
- Design and execute simulations to test and refine networking solutions for real-world scalability and performance.
- Development of RENET, which outperforms existing solutions by over 30% in Quality of Service (QoS) satisfaction rate and improves the quality of adaptive video streams by up to 54%.

**Freelance**                                                                                                       **Remote**
*Freelance Web Devleoper*                                                                                *June 2020 - Present*
- Develop web applications using Django and Django Rest Framework.
- Dockerize applications and configure web servers with Nginx.
- Utilize HTML, CSS, JavaScript, and Bootstrap to create responsive, user-friendly websites.
- Contribute to the development of Wird.app, a custom-contests (Kahoot Like) platform with more than 1K daily visitors.

**Safwa Academy**                                                                                                 **Remote**
*Programming Languages Instructor*                                                          *June 2022 - February 2024*
- Lead hands-on programming classes for youth students (10-15 years old), covering both beginner and advanced levels, with a cohort of over 20 students.
- Facilitate weekly lectures, assignments, and projects, ensuring active student engagement throughout the learning process.
- Guide students in building websites using HTML, CSS, Bootstrap 5, and Flask-Python.
- Students' class projects included a personal portfolio, password generator, Tic-Tac-Toe game, school management system, and other technically challenging tasks.

**John Wiley & Sons**                                                                                  **Amman, Jordan**
*Software Developer*                                                                            *October 2018 - August 2021*
- Develop back-end APIs and components to support platform functionality.
- Diagnose and resolve bugs in a timely and efficient manner.
- Write clean, maintainable code primarily in Java, ensuring high-quality software development.
- Work closely with Solution Architects, Project Managers, and Team Leaders.
- Contribute to the development of search features for Cell and The Lancet, with 4M articles and 100k daily visitors.

## EDUCATION

**University of Texas - Arlington**                                                       **August 2023 - June 2026**
*PhD, Computer Science*                                                                                        *GPA: 4*

**University of Nevada - Reno**                                                         **August 2021 - August 2023**
*Master's, Computer Engineering*                                                                          *GPA: 3.9*

**University of Jordan**                                                                  **September 2015 - June 2020**
*Bachelor's, Computer Engineering*                                                                        *GPA: 3.2*

## PROJECTS & OUTSIDE EXPERIENCE

**SDN-Enabled Federated Learning for Optimized Network Communication**                     *January 2024 - Present*
- Focus on optimizing network communication for Federated Learning using Software-Defined Networking (SDN).
- Integrate the Flower framework for Federated Learning with SDN tools like ONOS, Mininet, and PyTorch to enhance the efficiency and scalability of distributed machine learning models.
- Utilize the SDN controller (ONOS) to manage dynamic routing, minimizing communication latency and improving performance across multiple edge devices.
- Test in simulated environments using Mininet and optimize through real-time adjustments based on network conditions.
- Aim to accelerate model training while reducing bandwidth consumption.

**RENET: Adaptive Routing for Edge Networks**                    *February 2022 - August 2023*
- Develop RENET, an adaptive routing algorithm designed to manage bandwidth fluctuations in edge networks, particularly in remote areas with harsh weather conditions.
- Enable rapid detection of wireless link bandwidth fluctuations and adjust flow paths to optimize the network utilization.
- Employ a novel delay-based measurement technique to monitor bandwidth changes.
- Outperform existing solutions by over 30% in Quality of Service (QoS) satisfaction rate.
- Improve the quality of adaptive video streams by up to 54%.
- Test in both real-world and emulated networks using various testing tools.

**Wird Application**
*Backend Engineer*                                                          *2020 - 2024*
- Lead a team of 10 developers to design and build Wird, an application for tracking and improving students' Ramadan activities.
- Build and maintain the system's APIs and optimize performance to ensure scalability and efficiency.
- Develop and manage the Admin Panel, which allows admins to create contests, track student progress, and generate reports.
- Develop and manage the Student App, enabling students to log activities, view performance, and compete.
- Use Django REST Framework (DRF) APIs to develop the backend, connected to React (admin panel) and Flutter (student app), with Redis caching to optimize performance.
- Design and implement secure APIs, data validation, and real-time progress tracking.
- Contribute 600+ commits since 2022, ensuring continuous improvement and updates to the application.

## SKILLS

**Programming & Development:** Java, Python, Spring, Flask, Django, Django Rest Framework, REST APIs, GraphQL, Bootstrap, Selenium, BeautifulSoup, Maven
**Machine Learning & Research:** Deep Learning, Federated Learning, Keras, PyTroch, Matplotlib, NumPy, Pandas
**Networking:** P4, SDN, Mininet, TCP/IP, HTTP/HTTPS, Wireshark, Postman, OpenFlow
**Systems:** Linux/Unix, PostgreSQL, Redis, Git, Docker, Nginx
**Others:** JIRA, Agile, SCRUM, Critical Thinking, Continuous Learning, Presentation Skills, Public Speaking, Leadership, Mentorship and Coaching