

Muhamad Felemban, PhD

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RESEARCH INTERESTS **Data Security and Privacy, Secure and Intelligent Systems, Quantum Computing, and Post-Quantum Security**

EMPLOYMENT **KFUPM – Dhahran, Saudi Arabia** **September 2022 – Present**
Director, Interdisciplinary Research Center for Intelligent Secure Systems

KFUPM – Dhahran, Saudi Arabia **February 2021 – September 2022**
Director (A), Interdisciplinary Research Center for Intelligent Secure Systems

KFUPM – Dhahran, Saudi Arabia **November 2023 – Present**
Assistant Professor, Information and Computer Science Department

KFUPM – Dhahran, Saudi Arabia **April 2018 – Present**
Assistant Professor, Computer Engineering Department

Saudi Aramco – Dhahran, Saudi Arabia **June 2018 – August 2018**
Information Security Division, ECC

IBM T.J Watson – Yorktown Heights, NY **May 2010 – July 2010**
Research Intern

SABIC – Al-Jubail, Saudi Arabia **Sept 2008 – March 2009**
Network Administrator

PROFESSIONAL SERVICE **Academic Advisor, SIMAQ** **January 2026 – Present**

Co-Founder and Board Member, SQCA **October 2024 – Present**

Quantum Technology Project Member, C4IR-WEF **January 2024 – Present**

EDUCATION **Purdue University – West Lafayette, IN, USA** **Aug 2012 - March 2018**
Ph.D., Electrical & Computer Engineering

- Dissertation topic: Designing and Development of Adaptive Intrusion Management for Cyber-Based Systems

KAUST – Thuwal, Saudi Arabia **Sept 2009 - Nov 2011**
MS, Computer Science

- Thesis topic: Optimal Node Placement in Underwater Acoustic Sensor Networks

KFUPM – Dhahran, Saudi Arabia **Sep 2003 - May 2008**
B.S., Computer Engineering

SELECT JOURNALS • Alfageer, Razan, Mustafa Ghaleb, Walid Aljoby, and **Muhamad Felemban**. "A Multi-Stage Learning Framework for Detecting Known and Novel Attacks in the Internet of Medical Things." IEEE Access 14 (2026): 48312-48326.

 • Saleh, Omar A., Saleem G. Rao, Mohammed Alghadeer, Ahmed A. Omar, and **Muhamad Felemban**. "Optimizing Interface Dielectric Loss in Superconducting Coplanar Waveguide Resonators for Improved Quantum Circuit Coherence." Technologies 14, no. 2 (2026): 128.

 • Sa'ad, Abdulmumin, **Muhamad Felemban**, and Abdulaziz Tabbakh. "CEFEEL: Communication-Efficient FEderated Learning for Personal Assistant Applications." IEEE Open Journal of the Computer Society (2025).

- Abudaqa, Anas A., Khaled Alshehri, and **Muhamad Felemban**. "On the Homomorphic Properties of Kyber and McEliece with Application to Post-Quantum Private Set Intersection." *Cryptography* 9, no. 4 (2025): 66.
- Kara, Mostefa, Konstantinos Karampidis, Spyros Panagiotakis, Mohammad Hammoudeh, **Muhamad Felemban**, and Giorgos Papadourakis. "Lightweight and Efficient Post Quantum Key Encapsulation Mechanism Based on Q-Problem." *Electronics* (2025).
- Kara, Mostefa, Ammar Boukrara, Mohammad Hammoudeh, **Muhamad Felemban**, and Samir Guediri. "Unbounded Depth ElGamal-Based Asymmetric Updatable Encryption Technique." *IEEE Open Journal of the Computer Society* (2025).
- Kara, Mostefa, Mohammad Hammoudeh, **Muhamad Felemban**, and Konstantinos Karampidis. "An encrypted and signed plaintext symmetric cryptosystem." *Computers and Electrical Engineering* 123 (2025).
- Saleh, Omar A., Saleem G. Rao, Khan Alam, and **Muhamad Felemban**. "Mitigation of oxide growth on aluminum thin films: The role of self-assembled monolayers in superconducting quantum circuits." *AVS Quantum Science* 7, no. 2 (2025).
- Adebayo, Sulaimon Oyeniya, Abdulaziz Barnawi, Tarek Sheltami, and **Muhamad Felemban**. "Dynamic spectrum sharing in heterogeneous wireless networks using deep reinforcement learning." *Internet of Things* 32 (2025).
- AlOtaibi, Nourah S., **Muhamad Felemban**, and Sajjad Mahmood. "Edge-Assisted Label-Flipping Attack Detection in Federated Learning." *IEEE Open Journal of the Communications Society* (2024).
- **Felemban, Muhamad**, Mustafa Ghaleb, Kunwar Saa'im, Saleh Al-Saleh, and Ahmad Almulhem. "File Fragment Type Classification using Light-Weight Convolutional Neural Networks." *IEEE Access* (2024).
- Alsuwaiyan, Ali, Aliyu Abubakar Habib, Ali Bello Imoukhuede, Mohamed Osman Omar, Md Al Maruf, Mansour Alqarni, Aiman El-Maleh, Abdulaziz Tabbakh, **Muhamad Felemban**, and Akramul Azim. "A Systematic Literature Review on Vulnerabilities, Mitigation Techniques, and Attacks in Field-Programmable Gate Arrays." *Arabian Journal for Science and Engineering* (2024): 1-31.
- Mohamed, Tarik N., Hassan Alsafar, and **Muhamad Felemban**. "Exploring The Human Response To Anger: Uncovering Insights Through Infrared Thermography And Experimental Psychology." *Acta Neuropsychologica* 22, no. 3 (2024).
- Daghistani, Anas, Musab Khayat, **Muhamad Felemban**, Walid Aref and Arif Ghafoor, "Guard: Attack-Resilient Adaptive Load Balancing in Distributed Streaming Systems," in *IEEE Transactions on Dependable and Secure Computing* (2022).
- Felemban, Emad, Faizan Ur Rehman, Akhlaq Ahmad, and **Muhamad Felemban**. "A Modelling and Scheduling Tool for Crowd Movement in Complex Network." *Intelligent Automation and Soft Computing* (2022).
- Umer, Sani, **Muhamad Felemban**, Rule-Based Detection of False Data Injections Attacks against Optimal Power Flow in Power Systems. *Sensors*, (2021).
- Javed, Y., **Muhamad Felemban**, Tawfeq Shawly, Jason Kobes, and Arif Ghafoor, 2019. A Partition-Driven Integrated Security Architecture for Cyber-Physical Systems. *Computer* 53(3): 47-56 (2020).
- **Felemban, Muhamad**, Emad Felemban, Jason Kobes, and Arif Ghafoor. "Threat Management in Data-centric IoT-Based Collaborative Systems." *ACM Transactions on Internet Technology (TOIT)* 19, no. 3 (2019).
- Elgabli, Anis, **Muhamad Felemban**, and Vaneet Aggarwal. "GroupCast: Preference-aware cooperative video streaming with scalable video coding." *IEEE/ACM Transactions on Networking* (2019).
- Elgabli, Anis, **Muhamad Felemban**, and Vaneet Aggarwal. "GiantClient: Video hotspot for

multi-user streaming.” IEEE Transactions on Circuits and Systems for Video Technology (2018).

- Arshad, M.U., **Muhamad Felemban**, Pervaiz, Z., Ghafoor, A. and Aref, W.G. ”A Privacy Mechanism for Access Controlled Graph Data”. IEEE Transactions on Dependable and Secure Computing. (2018)
- **Muhamad Felemban**, S. Basalamah, Arif Ghafoor, ”A Distributed Cloud Architecture for Mobile Multimedia Services,” In *IEEE Network*, 2013
- Felemban, Abdullah, Mustafa Ghaleb, and **Muhamad Felemban**. ”Exaggeration-based Fake Cybersecurity News Detection.” In Proceedings of the 1st ACM Workshop on Deepfake, Deception, and Disinformation Security, pp. 1-4. 2025 (**Best paper award**).
- Al-Ogbi, S. A., and **Muhamad Felemban**. ”Solving Computational Fluid Dynamic Problems Using Quantum Computing.” In SPE Middle East Oil and Gas Show and Conference, p. D031S108R004. SPE, 2025.
Ellouh, Mahmoud, Radwan Jalali, and **Muhamad Felemban**. ”FalconAI: Cloud-based Automatic Execution of AI Workflows.” In 2025 3rd International Conference on Foundation and Large Language Models (FLLM), pp. 58-61. IEEE, 2025.
- Almuqbil, Tariq, and **Muhamad Felemban**. ”Discovery of Quantum Algorithms Using Genetic Algorithms: Exponential Speedup via Random Sampling.” In 2024 IEEE International Conference on Quantum Computing and Engineering (QCE), vol. 2, pp. 444-445. IEEE, 2024.
- Alghamdi, Muath, Mohammed Abushawarib, Mahmoud Ellouh, Mustafa Ghaleb, and **Muhamad Felemban**. ”Enhancing Arabic Information Retrieval for Question Answering.” In Proceedings of the 7th International Conference on Future Networks and Distributed Systems, pp. 366-371. 2023.
- Mohammad Alsaiyari and **Muhamad Felemban**, ”Variational Quantum Algorithms for Solving Vehicle Routing Problem,” 2023 International Conference on Smart Computing and Application (ICSCA), Hail, Saudi Arabia, 2023, pp. 1-4, doi: 10.1109/ICSCA57840.2023.10087522.
- Shuroog Al-Ogbi, Abdulrahman Ashour and **Muhamad Felemban**, ”Quantum Image Classification on NISQ Devices,” 2022 14th International Conference on Computational Intelligence and Communication Networks (CICN), Al-Khobar, Saudi Arabia, 2022, pp. 1-7
- Khaled Butainy, **Muhamad Felemban** and Hamzah Luqman, ”Realistic Face Masks Generation Using Generative Adversarial Networks,” 2022 14th International Conference on Computational Intelligence and Communication Networks (CICN), Al-Khobar, Saudi Arabia, 2022, pp. 90-95, doi: 10.1109/CICN56167.2022.10008304.
- Mahmoud Ellouh, Mustafa Ghaleb and **Muhamad Felemban**, ”IoTZeroJar: Towards a Honey-pot Architecture for Detection of Zero-Day Attacks in IoT,” 2022 14th International Conference on Computational Intelligence and Communication Networks (CICN), Al-Khobar, Saudi Arabia, 2022, pp. 765-771, doi: 10.1109/CICN56167.2022.10008323.
- Kunwar Saaam, **Muhamad Felemban**, Saleh Al-Saleh, Ahmed Al-Mulhem. ”Lightweight File Fragments Classification using Depthwise Separable Convolution”. 37th International Conference on ICT Systems Security and Privacy Protection, IFIP SEC 2022, Copenhagen, Denmark.
- Asaad Al-Ghamdi, Younes Balah, Mohammad Al-Bejadi, **Muhamad Felemban** and Y. Osais, ”BeeCast: A Device-to-Device Collaborative Video Streaming System,” 2022 International Wireless Communications and Mobile Computing (IWCMC), 2022.
- S. Umar, **Muhamad Felemban** and Y. Osais, ”Advanced Persistent False Data Injection Attacks Against Optimal Power Flow in Power Systems,” 2021 International Wireless Communications and Mobile Computing (IWCMC), 2021.
- Asaad Alghamdi, Younes Balah, Mohammad Albejadi, and **Muhamad Felemban**. 2020. BeeCast: a collaborative video streaming system. Proceedings of the 26th Annual International Conference on Mobile Computing and Networking (MobiCom 2021). ACM , New York, NY, USA, Article 63, 1–3.

CONFERENCE
PAPERS

RESEARCH
GRANTS

Quantum Algorithm Design and Emulation for Seismic Wave Modeling: PI[SAAR 700,000]

(Funded by Saudi Aramco 2026-2028)

Novel Passwordless User Authentication System for Quantum Computing Environment:
CO-I[SAAR 800,000]

(Funded by PSDSARC 2025-2028)

Using Quantum Computing for Reservoir Simulation : PI[SAR 300,000]

(Funded by Saudi Aramco 2025-2026)

Robust, Privacy Preserving Surveillance System for COVID-19 : PI

(Funded by KACST 2020-2021)

Design and Implementation of Adaptive Intrusion Management System: PI

(Funded by DSR, KFUPM 2020-2021)

Collaborative Video Streaming: PI

(Funded by DSR, KFUPM 2020-2021)

TEACHING
& ADVISING
EXPERIENCE

Current graduate students advising:

- Urooj Ghani, PhD, KFUPM (2026 - now)
Project: Quantum Software Engineering
- Bushra Alowaid, PhD, KFUPM (2025 - now)
Project: Distributed Quantum Computing
- Hind Baagel, PhD, KFUPM (2024-now)
Project: Post-Quantum Cryptography
- Lina Alharbi, PhD, KFUPM (2024-now)
Project: Practical Private Set Intersection
- Soha Sandoukah, PhD, KFUPM (2023 - now)
Project: Robust and Secure Federated Learning
- Abdulmjeed Al-Othman, MSc, KFUPM (2024 - now)
Project: Post-quantum cryptography migration

Graduated students:

- Nourah Al-Otaibi, PhD, KFUPM (2021-2025)
Thesis: Edge-Assisted Detection and Mitigation of Label-Flipping Attacks in Federated Learning Systems
- Ekhlas Zaid, MSc, KFUPM (2025 - 2026) *Project: Backdoor Attack on Federated Learning*
- Maram Al-Qahtani, MSc, KFUPM (2024 - 2025)
Project: Machine Unlearning
- Abdulmunim Sa'ad, MSc, KFUPM (2023-2024)
Project: Federated Learning based Mobile Application
- Shurooq Al-Oqbi, MSc, KFUPM (2023-2024)
Project: Quantum Algorithms for Solving Partial Differential Equations
- Mustafa Al-Ghafli, MSc, KFUPM (2021-now)
Project: Private Set Intersection in Mobile Crowdsensing
- Sani Umar, MSc, KFUPM (2021)
Project: Modeling and Detecting False Data Injection Attacks in Smart Grids
- Mohammad AlAkhras, MEng, KFUPM (2021)
Project: Efficient Network Coding in Wireless Sensor Network

TEACHING
& ADVISING
EXPERIENCE

MX Graduate students advising:

- Tariq AlMuqbil, QIC MX, KFUPM (2024)
Project: Quantum Circuit Generator using Evolutionary Algorithms
- Maha Al-Otaibi, QIC MX, KFUPM (2024)
Project: Battery Revenue Optimization using Quantum Computing
- Abdulrahman Alajmi, QIC MX, KFUPM (2024)
Project: Quantum Random Number Generator
- Abdulhadi Alzaidy, QIC MX, KFUPM (2024)
Project: Quantum Random Number Generator
- Ahoud Alhawash, QIC MX, KFUPM (2024)
Project: Quantum Algorithms for PDEs
- Mohammad Al-Saiyari, QIC MX, KFUPM (2022)
Project: Quantum Optimization for Vehicle Routing Problem
- Rokiya Ghandour, QIC MX, KFUPM (2022)
Project: Quantum Computing Application in Finance
- Mays Miajan, QIC MX, KFUPM (2022)

- *Project: Quantum Computing Application in Finance*
- Joud Awadh, QIC MX, KFUPM (2022)
Project: Quantum Computing Application in Finance
- Shuroog Al-Ogbi, QIC MX, KFUPM (2022)
Project: Quantum Support Vector Machines
- Bashayer Al-Nahdi, QIC MX, KFUPM (2022)
Project: Quantum Random Number Generator
- Maryam Baabdullah, QIC MX, KFUPM (2021)
Project: Quantum Support Vector Machines
- Sarah Al-Wadaah, QIC MX, KFUPM (2021)
Project: Feasibility of using Quantum Computing in Seismic Image Processing

Undergraduate students advising:

- Mohammad Serag, COE, KFUPM (2025)
Prompt-anonymization
- Abdullah Emad Felemban, CS, OSU (2025)
Exaggeration-based security fake news detection
- Joud Zamzami, CS, UMASS (2025)
Distributed quantum computing
- Mariam Alsowaidan, Kuwait, (2025)
Cybersecurity
- Talal Al-Towaijri, CS, IAU (2024)
Quantum Algorithms for VRP
- Zahra Homoud, EE, Leeds University (2024)
Light-Weight Deep Learning
- Osamah Al-Karnawi, COE, KFUPM (2024)
DGA-based domains detection
- Amer Mosalli, COE, KFUPM (2023)
Project: Event-Detection Using Edge-base Vehile Dashcamss
- Khaled AlShehri, Math, KFUPM (2022)
Project: Private Set Intersection using Lattice-based Cryptography
- Khaled Al-Butainy, COE, KFUPM (2022)
Project: Masking Unmasked Faces Using GANs Based Models
- Khaled Al-Zahrani, Phys, KFUPM (2021)
Project: Increasing Fidelity of IBM Q Swap Gates
- Othman Kisha, COE, KFUPM (2021)
Project: Privacy Requirement for Contact Tracing Applications
- Kunwar Saaam, COE, Aligrah Muslim University, India (2022)
Project: File Fragment Classification Using Deep Learning
- Mohammad Khiami, COE, KFUPM (2020)
Project: Write-Effecient LSM-based Merkle Trees
- Abdulkarim Al-Alweet, COE, KFUPM (2020)
Project: File Fragment Classification Using Deep Learning
- Asaad Al-Ghamdi, ICS, KFUPM (2020)
Project: BeeCast: A Collaborative Video Streaming System
1st runner up: ACM SRC - Undergraduate track 2021
- Mohammad Al-Bejadi, COE, KFUPM (2020)
Project: Collaborative Video Streaming
1st runner up: KAUST WEP Undergraduate Research Competition 2021

Undergraduate students mentoring:

- Ghanima Boutaiban, CS, GUST (Summer 2023)
- Yousef AbuShabaan, CS, GUST (Summer 2023)
- Abduljawad Mohammad, ICS, KFUPM (SURE 2021)
Project: Masking Unmasked Faces Using GANs Based Models
- Amaan Izhar, ICS, KFUPM (SURE 2021)
Project: Emotional Interpretation using Voice Recognition
- Mujtaba Siddiqui, ISE, KFUPM (SURE 2021)
Project: Simulation of COIVD-19 in KFUPM Campus
- Sultan Al-Garbi, ICS, KFUPM, India (SURE 2021)
Project: Federated Learning
- Mahmoud Ellouh, COE, KFUPM (SURE 2021)
Project: ZeroJar: IoT Honeypot for Zero-day Attacks Detection
- Murtada Al-Hasan, ISE, KFUPM (SURE 2021)
Project: Dynamic Class Scheduling with COVID-19 Constraints

- Hassan Al-Saffar, EE, KFUPM (SURE 2021)
Project: Emotional Recognition Using Thermal Pictures

High school students mentoring:

- Tala Al-Mulla, Dhahran (Ibdaa 2021 Finalist)
Project: Modeling and Simulation of University Class Schedules with COVID-19 Constraints
- Hussain AlSaif, Dhahran (Ibdaa 2022 Finalist)
Project: Using Reinforcement Learning in Quantum Error Correction Codes

Courses taught:

- SEC595: Special Topics on "Encrypted Computing"
- COE292: Introduction to Quantum Computing
- COE520: Queuing Theory and Network Applications
- COE466/530: Quantum Computer and Architecture
- COE531: Quantum Communication
- COE241: Data and Computer Communication
- COE445: Internet Information Services and Cloud Computing
- COE426/526: Data Privacy
- ISE361: Fundamental of Database Management
- ICS103: Introduction to Computer Programming

ACADEMIC SERVICE

- **Editorial Editor**
Discover Internet of Things, (2026)
- **Guest Editor**
Special Issue "Enhanced Cyber-Physical Security in IoT" in Information, MDPI (2022)
- **Educational programs development**
Cybersecurity and Blockchain MX (KFUPM), High-Performance and Cloud Computing MX (KFUPM), Quantum Information and Computing MX (KFUPM), Wireless Communication and Networking MX (KFUPM).
- **Reviewer**
IEEE TDSC, IEEE Sensors, IEEE Communication Letters, Journal of Sensors, ACM Computing Survey, Computer and Security, IEEE Computer, Doctoral Symposium Workshop MIDDLEWARE 2019