Mohammad A. Alshboul

Assistant Professor of Computer Engineering at the Jordan University of Science and Technology (JUST)
Email: maalshboul3@just.edu.jo
Professional Profiles: Website, LinkedIn, Google Scholar, ResearchGate.

Research and Leadership Highlights

- **Research Interests:** Computer Architecture, Memory Systems, Machine Learning Applications and Support, Secure and Reliable Computing.
- **Citations & Index:** h-index of 8, with 280+ citations.
- **High-Tier Publications:** Authored papers in premier venues (ISCA, HPCA, DAC) and Q1 journals.
- **Patent:** Inventor of US Patent 11,281,545 on crash recovery in Non-Volatile Main Memories (NVMM).
- **Grant Leadership:** PI of 3 funded projects and Co-PI of 1 project in robotics and AI.
- **Research Administration:** Assistant Dean of Scientific Research at JUST.
- **Mentorship:** Supervised 6 Master's theses and 10+ graduation projects (There is no Ph.D. program in the department).

Education

Ph.D. Computer Engineering: North Carolina State University (NCSU), USA [*Direct Ph.D.*] (2016 - 2021)
- GPA (ECE/CSC): 4.00/4.00
- Thesis: "Addressing Challenges of Non-Volatile Main Memory Integration"

M.S. Computer Engineering: North Carolina State University, USA [*Masters enroute*] (2016 - 2018)
- GPA (ECE/CSC): 4.00/4.00

B.S. Computer Engineering: Jordan University of Science and Technology(JUST), Jordan (2010 - 2015)
- GPA: 90.9/100; Valedictorian: Ranked First in a class of 79 students

Work Experience

- Assistant Dean, Deanship of Scientific Research, Jordan University of Science and Technology (JUST) [Sep. 2025 - Present]
- Assistant Professor, Computer Engineering Department, Jordan University of Science and Technology [Oct. 2021 - Present]
- Visiting Research Scholar, NC State University. Research on secure hybrid NVMM. [Jun. 2022 - Sep. 2022]
- CPU Engineer at Apple. Worked with the iPhone's CPU performance modeling team in improving the CPU's modeling and correlation, especially for the LSQ unit. [Dec. 2020 - May.2021]
- Intern at the Memory Research Group in Arm. Worked on a research problem related to the Non-Volatile Main Memories. [Sep.2019 - Dec. 2019]
- CPU Engineer at Apple. Worked within the iPhone's Design and Verification team on improving the existing Memory Coherence/Communication environment [May.2019 - Aug. 2019]
- Research Assistant, North Carolina State University. Focused on Computer Architecture and Memory Systems. Especially on topics related to Non-Volatile Memory (NVM) [Jan. 2017 - May. 2021]

Selected Publications *(* Authors with an asterisk are students under my direct supervision)*

Patents:

- Y. Solihin, **M. Alshboul**, and J. Tuck, Methods of Crash Recovery for Data Stored in Non-Volatile Main Memory. *US Patent 11,281,545*, 2022.

Peer-Reviewed Journals:

- B. Al-Qayyam*, **M. Alshboul**✉, N. Abdalfattah*, Y. Jararweh, Efficient Crash-safe Sorting for Systems with Non-Volatile Main Memory, *Future Generation Computer Systems* 176, 108-229 (2026).

- L. Hamad*, Q. Ananzeh*, M. Salameh*, A. Salem*, **M. Alshboul**✉ and M. Al-Ayyoub, Hierarchical Multi-Stage Framework for Robust and Explainable Tomato Leaf Disease Identification, in *IEEE Access* 13, 1-16 (2025).

- S. Alzoubi*, A. Rassas*, M. AlYamani*, and **M. Alshboul**✉, An Efficient Low Aggressiveness Portion (ELAP) Cache Replacement Policy For Systems With Non-Volatile Main Memory, *Journal of Cluster Computing* 28, 414 (2025).

- **M. Alshboul**✉, A. Al Muaitah, S. Al-Issa and M. Al-Ayyoub, Enhanced Neural Speech Recognition of Quranic Recitations via a Large Audio Model, *Journal of Applied Sciences* 2025, 15, 9521.

- H. Abed*, O. Al-Zoubi*, H. Alayan*, and **M. Alshboul**✉, Towards Maintaining Confidentiality and Anonymity in Secure Blockchain-based e-Voting, *Journal of Cluster* Computing 27, 4635–4657 (2024).

- **M. Alshboul**✉, H. Elnawawy, R. Elkhouly, K. Kimura, J. Tuck, and Y. Solihin, Efficient Checkpointing with Recompute Scheme for Non-volatile Main Memory, *ACM Transactions on Architectures and Code Generation (TACO)* journal, 2019.

Peer-Reviewed Conferences:

- S. Al-Issa, **M. Alshboul**✉, and M. Al-Ayyoub, Enhanced Neural Speech Recognizer for Quranic Recitations, 2023 *International Conference on Multimedia Computing, Networking and Applications (MCNA)*, 2023.

- **M. Alshboul**✉, P. Ramrakhyani, W. Wang, J. Tuck, and Y. Solihin, BBB: Simplifying Persistent Programming using Battery-Backed Buffers, *Proc. of the 27th IEEE International Symposium on High-Performance Computer Architecture (HPCA)*, March 2021.

- **M. Alshboul**✉, J. Tuck, and Y. Solihin. WET: Write Efficient Loop Tiling for Non-Volatile Main Memory, *Proc. of the 57th ACM/IEEE Design Automation Conference (DAC)*, July 2020.

- **M. Alshboul**✉, J. Tuck, and Y. Solihin. Lazy Persistency: An Efficient Persistency Technique for Scientific Applications, Proc. of the *International Symposium on Computer Architecture (ISCA)*, June 2018.

- H. Elnawawy, **M. Alshboul**✉, J. Tuck, Y. Solihin. Efficient Checkpointing of Loop-based Codes for Non-Volatile Main Memory, *Proc. of the International Conference on Parallel Architectures and Compilation Techniques (PACT)*, Sep 2017.

Funded Projects and Grants

- Principal Investigator (PI) for the project titled "*FloraBot: Autonomous Self-Decision-Support Agricultural Robot by Combining VLMs, LLMs, and RL for Efficient, Adaptive and Sustainable Farming Practices*" from the Jordan Design and Development Bureau (JODDB). Grant No: 002/2025.

- Principal Investigator (PI) for the research project titled "*Using Automatic Speech Recognition for Correcting Qur'anic Recitation*" from the Deanship of Scientific Research at the Jordan University of Science and Technology. Research Grant No: 113/2023.

- Principal Investigator (PI) for the project titled: "*Development and Evaluation of an Intelligent Footwear Navigation System for the Visually Impaired: A Substitute for Traditional Mobility Aids*", funded by the Center of Excellence for Innovative Projects at Jordan University of Science and Technology.

- Co-PI for the project titled "*Dual-Drive Heavy-Lift Hexacopter: A Novel Hybrid Propulsion System for Extended Flights*", funded by the Scientific Research and Innovation Support Fund at the Ministry of Higher Education and Scientific Research.

Professional and Community Services

- Assistant Dean, Deanship of Scientific Research, Jordan University of Science and Technology
- Journal Referee: Future Generation Computer Systems (ISSN: 0167-739X)
- Journal Referee: The Journal of Supercomputing (ISSN: 0920-8542)
- Journal Referee: ACM Transactions on Architecture and Code Optimization (ISSN: 1544-3566)
- Point of Contact for the Deanship of Research with the ITCC Department in the University
- Point of Contact for the Deanship of Research with the Center of Sustainable Projects
- Computer Engineering Department's Faculty Representative at the Deanship level
- Focus Group Leader: Systems and Software Focus Group for Accreditation and Quality Control
- Committee Member: Appointments and Delegations Committee (Computer Engineering Dept)
- Committee Member: Curriculum and Course Equivalency (Computer Engineering Dept)
- Committee Member: Accreditation and Quality Control Committee (Computer Engineering Dept)
- Serving on Master's thesis defense committees
- Referre at the 11th edition of the National Technology Parade for Jordanian University Students
- Course coordinator for several courses and labs in the computer engineering department

Honors and Awards

- Best Computer Engineering project award in the ICICS'25 conference's competition 2025
- Received the JODDB grant for excellent graduation projects (National Level) 2025
- Received HKN Honor recognition due to PhD achievements 2020
- Received Hassan's Fellowship for top PhD students in engineering 2018
- **Valedictorian**: Graduated with the highest GPA among a 79-student batch 2015
- Mentioned in the **Dean's Honors list** 8 times throughout the bachelor's degree 2015
- **First place** (out of 20+) nationally, in *Intel's* competition for microprocessors 2015
- **First place** (out of 40+) in the Local ACM contest at the university level 2012
- **Second place** (national, 100+), **fourth place** in IEEE Xtreme programming (Middle East level) 2012

Master's Theses at JUST *(There is no Ph.D. program in the department)*

TBD Optimizing Merkle-Tree Operations by Utilizing Read-Only Memory Regions (**Advisor**)
TBD Efficient Crash-Consistent Large-Language Models for Systems with Non-Volatile Main Memory (**Advisor**)
TBD Enhancing Neural Speech Recognizer for Quranic Recitations (**Advisor**)
2026 Deep Learning-Enhanced Leukocyte Subtype Classification in Electrical Impedance Cytometry (**Member**)
2025 Efficient Crash-safe Sorting for Systems with Non-Volatile Main Memory **(Advisor)**
2025 Efficient Software-only Recovery Technique for Systems with Non-Volatile Main Memory **(Advisor)**
2024 An LSTM-based Fine-Grained Resource Prediction Model in Google Cloud Workload Trace **(Co-Advisor)**
2023 Empirical Study To Compare The Performance Of Novel Cpu Implementation Of Deep Learning Algorithms With Gpu-Based Implementations **(Committee Member)**

Selected Supervised Graduation Capstone Projects *(~four students per project)*

- A Portable IoT Framework for Real-Time Air Quality Assessment in Asthmatic Patient Care
- Towards a Robust and Autonomous Self-Decision-Support Agricultural Robot
- A Peer-to-Peer Framework for Food Security: Connecting Surplus Donors with Verified Recipients via Mobile Technology
- An Automated Workflow-Based Chatbot Builder: A No-Code Solution
- Development and Evaluation of an Intelligent Footwear Navigation System for the Visually Impaired
- Deepfake Detection and Authentication: A Multi-Modal Approach to Classifying AI-Generated Media
- Towards maintaining confidentiality and anonymity in secure blockchain-based e-voting
- Design and Implementation of a Smart Stabilization Utensil and Companion Diagnostic Application for Hand Tremor Management
- Beyond Code: A User-Centric Interface for Automated Deep Learning and Model Deployment
- An Efficient Low-Aggressiveness Portion (ELAP) Cache Replacement Policy for Systems with Non-Volatile Main Memory
- Enhancing Library Infrastructure: A QR-Based Automated Check-In and Space Utilization System
- Blockchain-based Decentralised Documentation System for Verifying Global News

Teaching Experience *(Semester Workload: 12 Credit Hours)*

Taught several core courses with typical enrollment of 60–120 students; coordinated multiple labs and courses.

- CPE 473: Operating Systems
- CPE 352: Computer Architecture
- CPE 231: Digital Logic Design
- CPE 354: Microprocesor Systems Lab
- CPE 232: Digital Logic Design Lab
- ECE 212: Fundamentals of Logic Design

Conferences and Presentations

- The 16th International Conference on Information and Communication Systems (ICICS), 2025
- The IEEE International Conference on Engineering and Computing Technologies (EngiTek), 2025
- The 3rd International Conference on The Role of Artificial Intelligence in Research and Its Ethics, 2025
- The 11th edition of the National Technology Parade for Jordanian University Students, 2024
- The 7th International Conference on Multimedia Computing, Networking, and Applications (MCNA'23)
- The 49th International Symposium on Computer Architecture (ISCA), June 2022
- The 27th IEEE International Symposium on High-Performance Computer Architecture (HPCA), 2021
- The 57th ACM/EDAC/IEEE Design Automation Conference (DAC), 2020
- The 28th International Conference on Parallel Architectures and Compilation Techniques (PACT), 2019
- The 45th International Symposium on Computer Architecture (ISCA), June 2018
- The 26th International Conference on Parallel Architectures and Compilation Techniques (PACT), 2017

Technical Qualifications

- **Programming Qualifications**: C, C++, C#, JAVA, Python, Verilog HDL, LLVM IR, and Bash scripting
- **Gem5 Simulator**: Used for my research work and for some coursework projects.
- **Assembly**: X86 assembly, Motorola 68000 assembly, and MIPS

Selected Projects and Assignments

- **Detailed Superscalar Processor Simulator:** Working on almost all the parts of the CPU simulator using C/C++. The work included designing all the needed internal structures (e.g. Registers Free List, Active List, Physical Register File).
- **Advanced Cache Coherence Project:** The work was done using the gem5 simulator (Ruby Mem). Implementing two different coherence protocols, making a comparison between them, and finally combining them for improvement.
- **Cache Simulator:** Design a configurable cache system that allows varying the cache size, number of cache levels, replacement policy, Inclusiveness method, and some other characteristics.
- **Out-of-Order 9-Stage Pipeline Simulator:** Design a configurable full out-of-order processor. In addition to supporting branch prediction units and a prefetching unit.
- **Operating System Implementation:** Modifying and implementing some parts of the OS kernel. Including the OS scheduler and the Demand Paging unit. Used C/C++ to modify the kernel source code for XINU OS. In addition to modifying the low-level assembly code to implement accurate interrupts.
- **Object Tracking System:** Used in controlling Unmanned Aerial Vehicle (UAV). The task included extracting features and then tracking objects using Optical Flow algorithms.
- **Sentiment Analysis of Arabic Reviews**: Used morphological knowledge and the information from the structure of the sentence, programmed in Java.

References

Available upon request.