

Ahmad Al-Tawaha

PH.D. CANDIDATE · ELECTRICAL & COMPUTER ENGINEERING

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Summary

I am a fifth-year Ph.D. candidate developing **temporally robust learning, optimization, and control algorithms** that remain reliable under **non-stationarity and temporal drift**. My research bridges **distributed optimization, online system identification, and agentic AI**, focusing on decision-making systems that stay stable, safe, and adaptive—from semidefinite optimization in power systems to memory safety and reasoning stability in large-language-model agents.

Education

Virginia Polytechnic Institute and State University (Virginia Tech)

PH.D. ELECTRICAL AND COMPUTER ENGINEERING

- Advisor: **Dr. Ming Jin**

Blacksburg, VA

August 2021 - Present

Jordan University of Science and Technology

MS MECHANICAL ENGINEERING, MECHATRONICS

- Thesis: Model Order Determination with Applications in System Identification, Image and Signal Processing
- Advisor: **Dr. Khaled F. Aljanaideh**
- GPA: 4.2/4.4

Irbid, Jordan

August 2018 - May 2021

Jordan University of Science and Technology

B.TECH AERONAUTICAL ENGINEERING

- GPA: 86.7%
- Graduated top of class out of 40 students (1/40)

Irbid, Jordan

August 2012 - November 2016

Academic Experience

Electrical and Computer Engineering Department, Virginia Tech

GRADUATE RESEARCH ASSISTANT

- Mentor: Dr. Ming Jin
- Developing temporally robust learning, optimization, and control algorithms resilient to non-stationarity from distributed optimization to agentic AI.

Blacksburg, Virginia

August 2021 - Present

Jordan University of Science and Technology

RESEARCH ASSISTANT

- Worked on model order determination with applications in system identification.

Irbid, Jordan

May 2021 - August 2021

Jordan University of Science and Technology

RESEARCH ASSISTANT, FUEL CELL-GAS TURBINE HYBRID POWER & AUTOTRONICS

- Conducted research on fuel cell-gas turbine hybrid power systems and automotive electronics (autotronics).

Irbid, Jordan

June 2017 - August 2018

Jordan University of Science and Technology

RESEARCH ASSISTANT, COMPOSITE MATERIALS LAB

- Conducted interlaminar fracture toughness testing of composite laminates, including Mode I (opening) and Mode II (in-plane shear) using the End-Notched Flexure (ENF) test.

Irbid, Jordan

November 2016 - June 2017

Publications

JOURNAL PUBLICATIONS

Al-Tawaha, Ahmad, Cibaku, Elson, Park, SangWoo, Lavaei, Javad, Jin, Ming, “Distributed Optimization and Learning: A Paradigm Shift for Power Systems”, *IEEE Systems Journal*, **accepted, 2025**.

Al-Tawaha, Ahmad, Alshorman, A., Aljanaideh, K. F., “A Nonheuristic Singular Value Thresholding Algorithm for Order Estimation”, *Journal of Dynamic Systems, Measurement, and Control*, **accepted, 2025**.

CONFERENCE AND WORKSHOP PUBLICATIONS

Al-Tawaha, Ahmad, Lavaei, Javad, Jin, Ming, “A Dynamic Penalization Framework for Online Rank 1 Semidefinite Programming Relaxations.” Learning for Dynamics & Control Conference (**L4DC 2025**).

Sel, B., **Al-Tawaha, Ahmad**, Khattar, V., Jia, R., Jin, M., “Algorithm of Thoughts: Enhancing Exploration of Ideas in Large Language Models.” (**ICML 2024**).

Al-Tawaha, Ahmad*, Zain Ul-Abdeen*, Padmaksha Roy*, Jia, R., Freeman, L., Beling, P., Liu, C.-C., Sangiovanni-Vincentelli, A., Jin, M., “Defense against Joint Poison and Evasion Attacks: A Case Study of DERMS.” (**AAAI 2025 Workshop Paper**).

Al-Tawaha, Ahmad, Aljanaideh, K. F., Alshorman, A., “An Analytical Approach to Signal Denoising Based on Singular Value Decomposition.” (**ACC 2025**).

Mohammad, R., **Al-Tawaha, Ahmad**, Shouman, M., Atallah, A., Jin, M., “Monte Carlo Grid Dynamic Programming: Almost Sure Convergence and Probability Constraints.” (**ACC 2025**).

Al-Tawaha, Ahmad, Jin, M., “Does Online Gradient Descent (and Variants) Still Work with Biased Gradient and Variance?” (**ACC 2024**).

Sel, B., **Al-Tawaha, Ahmad**, Ding, Y., Jia, R., Ji, B., Lavaei, J., Jin, M., “Learning to Learn to Guide Random Search: Derivative Free Meta Blackbox Optimization on Manifold.” (**L4DC 2023**).

Al-Tawaha, Ahmad, Kaushik, H., Sel, B., Jia, R., Jin, M., “Decision Focused Learning for Inverse Noncooperative Games: Generalization Bounds and Convergence Analysis.” (**IFAC World Congress 2023**).

Al-Tawaha, Ahmad, Aljanaideh, K. F., Alshorman, A., “A Singular Value Thresholding Algorithm for Order Estimation.” (**ACC 2023**).

PAPERS UNDER REVIEW (SHAREABLE UPON REQUEST)

Al-Tawaha, Ahmad, Jia, R., Jin, Ming., “Remembering More, Risking More: Longitudinal Safety Risks in Memory-Equipped LLM Agents,” under review at NeurIPS.

Peizhi Niu, Shangding Gu, Wenjie Qu, Tianneng Shi, Yuankai Li, **Al-Tawaha Ahmad**, Hend Alzahrani, Vincent Siu, Boyi Li, Chenguang Wang, Jiaheng Zhang, Basel Alomair, Ming Jin, Muhao Chen, Chi Wang, Costas Spanos, Dawn Song, “Safe-ClawBench: An Operating-System Perspective on Evaluating the Security of Claw-like Agent Systems ,” under review at NeurIPS.

Al-Tawaha, Ahmad, Aljanaideh, K. F., Jin, Ming., “Finite-Time Identification of LTI Systems Using Non-Causal FIR Models: A Unified Framework for Stable and Unstable Systems”

Ongoing Research Projects

- **Memory safety and stability in long horizon agentic systems.** This project studies how state, memory, and model structure shape behavior over time. The goal is to build diagnostics and guarantees for long horizon operation. We treat memory and context as evolving internal states and analyze when they lead to failures such as incorrect commitments, disclosure, or inconsistent decisions. The work develops measurable predictors from retrieval time signals and uses them to monitor risk before generation in agentic AI systems.

Awards & Scholarships

2026 **Pratt Fellowship**, Virginia Tech, Department of Electrical and Computer Engineering

Spring 2026

2024 **ACC 2024 Travel Scholarship**,

2012–2018 **Full Scholarship (B.Sc. & M.Sc.)**, Ministry of Education, Jordan

Outreach and Service

Conference Reviewer: ICML 2026; ICLR 2025; ACC 2024, 2025, 2026; CDC 2025; IFAC 2023, 2025; IEEE Transactions on Control of Network Systems

Tutorials: Distributed Control Strategies for Resilient Power Grids at SmartGridComm 2024 conference.

Technical Skills

Programming Languages and Tools: Python, MATLAB and Simulink, C++, \LaTeX , Mathematica, ANSYS, Pro Engineer

Frameworks: PyTorch, TensorFlow, CVX, CVXPY, Cvxpylayer, Gurobi, NumPy, Pandas, Scikit learn, experience with HPC