

Yazan Mohammad AL-Rawashdeh

Systems, Mechatronics, Automation, Robotics, Control

Contact Information

Email Address:	y.alrawashdeh@zuj.edu.jo
Mobile Phone Number:	+962-(077)-905-1868
September 1, 2024 - Present (Assistant Professor)	Al-Zaytoonah University of Jordan , 130 Amman 11733 Jordan Electrical Engineering Department Power and Control Program
February 2020 - April 25, 2024 (Post Doctoral Fellow)	Memorial University of Newfoundland , 230 Elizabeth Ave, St. John's, NL A1C 5S7 Mechanical Engineering Department Topic: Precision Motion Stages for Enhancing the Performance of Lithography in Semiconductor Manufacturing: Working on aspects of motion orchestration, task scheduling and prioritization. Also, developing optimal and robust trajectories utilizing input shaping, modeling and control, utilizing machine learning.
September 2018 - January 2020 (Adjunct Professor)	University of Jordan , Amman, Jordan Industrial Engineering Department

Academic Information

May 2018:	King Fahd University of Petroleum and Minerals , Dhahran, Saudi Arabia Ph.D. in Systems and Control Engineering GPA 3.844 out of 4.00 Ph.D. Thesis Title: Robust Behavioral Control of Multiagent Systems Developing a dynamical behavior-bank from which maritime, airborne, and ground robots over connected graphs can individually, competitively, or cooperatively select a behavior based on artificial intelligence, i.e., context-aware.
May 2014:	King Fahd University of Petroleum and Minerals , Dhahran, Saudi Arabia M.Sc. in Control and Instrumentation, Systems Engineering GPA 3.875 out of 4.00 M.Sc. Thesis Title: Improved Inertial Navigation System Using All-accelerometer Using a multitude of linear tri-axial accelerometers, the kinematics of linear and rotation motion of rigid bodies can be determined, along with estimates of the center of mass kinematics, and the gravitational field.
February 2006:	University of Jordan , Amman, Jordan Mechatronics Engineering Department B.Sc. in Mechatronics Engineering GPA 3.34 out of 4.00

US Patents (Published)

- (P1): **Y. M. Al-Rawashdeh**, Moustafa Elshafei Ahmed Elshafei, and Mohammad Fahd Al-Malki, "Method and Apparatus for Estimation of Center of Gravity Using Accelerometers," US 9568320 B2, February 2017.
- (P2): Moustafa Elshafei Ahmed Elshafei, **Y. M. Al-Rawashdeh**, and Hassen Ouakad, "Inertial navigation system using all-accelerometer," US 15/940223, December 2019.

Journals (Quartiles Q according to SJR, Impact Factor IF upon publication)

- Q1 (J1):** **Y. M. Al-Rawashdeh**, M. Elshafei, and M. Al-Malki, "In-Flight Estimation of Center of Gravity Position Using All-Accelerometers," *Sensors*, Vol. 14, no. 9, pp. 17567–17585, September. 2014.
IF 3.847
- Q1 (J2):** S. El-Ferik, **Y. M. Al-Rawashdeh**, and F. L. Lewis, "A Framework of Multiagent Systems Behavioral Control Under State-Dependent Network Protocols," in *IEEE Transactions on Control of Network Systems*, vol. 7, no. 2, pp. 734-746, June 2020.
IF 4.347
- Q1 (J3):** **Y. M. Al-Rawashdeh**, M. Al Janaideh, and M. Heertjes, "On characterization of a generic lithography machine in a multi-directional space," *Mechanism and Machine Theory*, vol. 170, pp. 104638, 2022.
IF 4.930

- Q1 (J4):** Y. M. Al-Rawashdeh, M. Al Janaideh and M. F. Heertjes, "Kinodynamic Generation of Wafer Scanners Trajectories Used in Semiconductor Manufacturing," in IEEE Transactions on Automation Science and Engineering, vol. 20, no. 1, pp. 718-732, January 2023.
IF 6.636
- Q1 (J5):** Y. M. Al-Rawashdeh, M. Al Janaideh, and M. Heertjes, "A suppress-excite approach for online trajectory generation of uncertain motion systems," Mechanical Systems and Signal Processing, vol. 186, pp. 109769, 2023.
IF 8.934
- Q2 (J6):** Y. M. Al-Rawashdeh, M. Elshafei, and H. Ouakad, "In-flight estimation of Quadrotor mass and Inertia using All-accelerometer," Journal of Vibration and Control. 2023 Jul 10:10775463231188355.
IF 2.633
- Q1 (J7):** Y. M. Al-Rawashdeh, M. Al Saaideh, and M. Al Janaideh, "A Prandtl-Ishlinskii Control-based Piezoceramic Actuator for an Industrial Multi-Stage Motion System," IEEE/ASME Transactions on Mechatronics. (Accepted)
IF 6.4
- Q1 (J8):** M. Pumphrey, M. Al Saaideh, Y. M. Al-Rawashdeh, N. Alatawneh, and M. Al Janaideh, "Force modeling of a reluctance motion system with multi-axial asymmetrical air gaps," Precision Engineering, 2023, DOI: 10.1016/j.precisioneng.2023.12.009.
IF 3.6
- Q1 (J9):** M. Al-Solihat, M. Al Saaideh, Y. M. Al-Rawashdeh, M. Al Janaideh, "On Investigating Dynamic Coupling in Floating Platform and Overhead Crane Interactions: Modeling and Control," *Nonlinear Dynamics* (2024): 1-17.
IF 5.2
- Q1 (J10):** Y. M. Al-Rawashdeh, M. Al Saaideh, M. Heertjes, T. Oomen, and M. Al Janaideh, "Model-Free Control for an Industrial Long-stroke Motion System with a Nonlinear Micropositioning Actuator," Mechatronics, Elsevier Ltd. (Accepted)
IF 3.1

Conferences (H-Index HI)

- (C1):** Y. M. Al-Rawashdeh, M. Elshafei, and S. El-Ferik, "Passive attitude estimation using gyroscopes and all-accelerometer IMU," 7th International Conference on Mechanical and Aerospace Engineering (ICMAE), London, 2016, pp. 368-376.
- (C2):** Y. M. Al-Rawashdeh and M. Elshafei, "Filtering Techniques for Estimating the Angular Motion Using All-Accelerometers," Applied Mechanics and Materials, Vol. 829, 2016, pp. 103-109.
- (C3):** Y. M. Al-Rawashdeh, M. F. Mysorewala and M. Elshafei, "In-flight alignment of distributed all-accelerometer network," IEEE Sensors Applications Symposium (SAS), Glassboro, NJ, 2017, pp. 1-6.
HI 14
- (C4):** Y. M. Al-Rawashdeh, S. E. Ferik and M. A. Abido, "Robust Full-Car Active Suspension System," 10th International Conference on Information and Communication Systems (ICICS), Irbid, Jordan, 2019, pp. 205-210
- (C5):** Y. M. Al-Rawashdeh, M. Al-Tamimi, M. Heertjes and M. Al Janaideh, "Micro-Positioning End-Stage for Precise Multi-Axis Motion Control in Optical Lithography Machines: Preliminary Results," American Control Conference (ACC), 2021, pp. 40-47.
HI 116
- (C6):** Y. M. Al-Rawashdeh, M. Al Janaideh, and M. Heertjes, "On Synchronization of Generic Lithography Machine Open-chains using a Novel Fine-Positioning Stage System," Conference on Control Technology and Applications (CCTA), 2021, pp. 1089-1094.
HI 9
- (C7):** Y. M. Al-Rawashdeh, M. Al Janaideh, and M. Heertjes, "On Step-And-Scan Trajectories Used in Wafer Scanners in Semiconductor Manufacturing," IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021, pp. 7580-7586 .
HI 128
- (C8):** Y. M. Al-Rawashdeh, M. Al Janaideh, and M. Heertjes, "Real-time Point-to-Point Motion Trajectories Generation for Uncertain Systems using Embedded Input Shaping: A Closed-Form Solution," American Control Conference (ACC), 2023, pp. 698-703.
HI 116
- (C9):** Y. M. Al-Rawashdeh, V. Reddy, M. Al Saaideh, A. M. Boker, H. Eldardiry, and M. Al Janaideh, "Near-Optimal Trajectory Generation for Flexible Motion Systems using Two-Boundary Approach," 2023 European Control Conference (ECC), Bucharest, Romania, 2023, pp. 1-6
HI 14
- (C10):** Y. M. Al-Rawashdeh, M. Elshafei, and H. Ouakad, "Mass and inertia estimation using All-accelerometer," IEEE Sensors Applications Symposium (SAS), 2023, pp. 1-5.
HI 14
- (C11):** Y. M. Al-Rawashdeh, M. Al Janaideh, and M. Heertjes, "Motion Orchestration in Dual-Stage Wafer Scanners," 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Detroit, MI, USA, 2023, pp. 8304-8309.
HI 139
- (C12):** Y. M. Al-Rawashdeh, M. Al Janaideh, and M. Heertjes, "Statistical Characterization of Position-Dependent Behavior using Frequency-Aware B-Spline," 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Detroit, MI, USA, 2023, pp. 8270-8275.
HI 139

- (C13): **Y. M. Al-Rawashdeh**, and M. Al Janaideh, "Cyber-attacks Detection and Mitigation Mechanism for Distributed Trajectory Generators," 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), Detroit, MI, USA, 2023, pp. 9205-9210.
HI 139
- (C14): **Y. M. Al-Rawashdeh**, M. Al Saaideh, and M. Al Janaideh, "Using Piezoceramic-Actuated Stages in Precision Long-Stroke Motion Systems: A Design Procedure," 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), Detroit, MI, USA, 2023, pp. 2659-2664.
HI 139
- (C15): **Y. M. Al-Rawashdeh**, M. Al Saaideh, A. M. Boker, H. Eldardiry, M. F. Heertjes and M. Al Janaideh, "Trajectory Generation Using Activator-Inhibitor Systems," 2023 62nd IEEE Conference on Decision and Control (**CDC**), Singapore, Singapore, 2023, pp. 8857-8863.
HI 134
- (C16): **Y. M. Al-Rawashdeh**, M. Al Janaideh, and M. Heertjes, "Time-Aware NURBS," 2024 American Control Conference (**ACC**).
HI 116 *Accepted.*
- (C17): **Y. M. Al-Rawashdeh**, M. Al Saaideh, M. Heertjes, and M. Al Janaideh, "On Precision Motion Control for an Industrial Long-Stroke Motion System with Nonlinear Micropositioning Actuator," 2024 American Control Conference (**ACC**).
HI 116 *Accepted.*
- (C18): M. Al Saaideh, M. Al-Solihat, **Y. M. Al-Rawashdeh**, K. Al Janaideh, and M. Al Janaideh, "Decoupling and Tracking Control of Offshore Crane System Effect by Unknown Roll/Heave Wave Motions Disturbances," 2024 American Control Conference (**ACC**).
HI 116 *Accepted.*
- (C19): **Y. M. Al-Rawashdeh**, M. Al Saaideh, M. Heertjes, and M. Al Janaideh, "Model-Free Control of a Class of High-Precision Scanning Motion Systems with Piezoceramic Actuators," 2024 IEEE International Conference on Robotics and Automation (**ICRA**).
HI 207 *Accepted.*
- (C20): **Y. M. Al-Rawashdeh**, M. Al Saaideh, M. Pumphrey, N. Alatawneh, and M. Al Janaideh, "Data-Driven Cable Slab Modeling using Neural Networks," 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**).
HI 139 *Accepted.*
- (C21): M. Al Saaideh, **Y. M. Al-Rawashdeh**, K. Al Janaideh, N. Alatawneh, and M. Al Janaideh, "Position Control of a Low-Energy C-Core Reluctance Actuator in a Motion System," 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**).
HI 139 *Accepted.*
- (C22): M. Al Saaideh, **Y. M. Al-Rawashdeh**, N. Alatawneh, A. M. Boker, and M. Al Janaideh, "Development of a Current-Position Control Strategy for Motion Systems Utilizing Nonlinear Reluctance Actuators," 2024 63rd IEEE Conference on Decision and Control (**CDC**).
HI 134 *Accepted.*
- (C23): **Y. M. Al-Rawashdeh**, M. Al Saaideh, M. Pumphrey, N. Alatawneh, and M. Al Janaideh, "Vision-Based Estimation of Cable Slab Forces in Precision Motion Applications," 2024 63rd IEEE Conference on Decision and Control (**CDC**).
HI 134 *Accepted.*

Teaching

IE096542	Automation	University of Jordan	Fall 2018
ME7205	Mechatronics II	Memorial University of Newfoundland	Spring 2023
0905549	Programmable Logic Controllers (PLC)	Al-Zaytoonah University of Jordan	Fall 2024
0909242	Digital Logic Design		
0905342	Control Systems		

Scholarships

(S1)	At the expense of the Royal High (for the children of the military) Jordan The University of Jordan B.Sc. in Mechatronics Engineering	2001-2006
(S2)	Ministry of Higher Education in the Kingdom of Saudi Arabia King Fahd University of Petroleum and Minerals. M.Sc. in Systems Engineering	2012-2014

(S3) Ministry of Higher Education in the Kingdom of Saudi Arabia.
King Fahd University of Petroleum and Minerals.
Ph.D. in Systems and Control Engineering.

2014-2018

Industrial Collaborations

ASML
Dr. Marcel Heertjes
Eindhoven University of Technology
Mechanical Engineering Department
2021 – Present

Working on aspects of motion orchestration, task scheduling and prioritization. Also, developing optimal and robust trajectories utilizing input shaping, modeling and control, utilizing machine learning.

ASML
Dr. Natheer Alatawneh
May 2023 – Present

Working on developing fractures prediction models of cable slabs under extremely high acceleration profiles.

Academic Collaborations

Virginia Polytechnic Institute and State University
Department of Computer Science
Dr. Hoda Eldardiry
Bradley Department of Electrical and Computer Engineering
Dr. Almuatazbellah Boker
June 2022 – Present

Working on aspects including machine learning, data-driven control, optimal two-boundary trajectory generation, and high-gain state observers.

Work Experience

June 2018-January 2020:
August 2010-September 2012:

Automation Engineer
Self-employed.
CNC, PLC, SCADA, Control Panels, Instrumentation, Pneumatic and Hydraulic systems.

August 2009-August 2010:

Teaching Assistant
University of Jordan
Amman, Jordan
Mechatronics Engineering Department.

April 2008 – August 2009:

Engineer
Institute of Applied Technology IAT
Al Ain, UAE
Engineering Labs

September 2006 – April 2008:

Engineer
University of Jordan
Amman, Jordan
Mechatronics Engineering Department.

Professional Courses

Institution:
Part of:
Platform:

Massachusetts Institute of Technology (MIT)
MicroMasters® Program in Principles of Manufacturing
edX

Manufacturing Process Control I:

Learn how to model variations in manufacturing processes and develop methods to reduce and control deterministic variations to achieve consistent process quality.

Manufacturing Process Control II:

Learn how to control process variation, including methods to design experiments that capture process behavior and understand means to control variability.

Supply Chains for
Manufacturing: Inventory
Analytics

Learn about effective supply chain strategies for companies that operate globally, with emphasis on how to plan and integrate supply chain components into a coordinated system.

Supply Chains for
Manufacturing: Capacity
Analytics

Learn about various models, methods and software tools to help make better decisions for system design in manufacturing systems and supply chains..

This course was formerly known as Supply Chains for Manufacturing II.

Manufacturing Systems I:

Learn about manufacturing systems and ways to analyze them in terms of material flow and storage, information flow, capacities, and times and durations of events, especially random events.

Fundamentals of
Manufacturing Processes

Study the processes used to manufacture products ranging from toys to smartphones, and learn fundamental principles and practical considerations that enable production at scale.

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