

KEY SKILLS

- EFQM Certified Assessor
- King Abdullah II Award Certified Assessor
- Lead a team to develop and select KPIs.
- Lead several Business Process Re-engineering/Improvement projects.
 - Analyze Employee Opinion Surveys.
 - Identify and prioritize projects –areas of improvements.
 - Perform Process Flowcharting (Current & Future).
 - Identify and diagnose value-added and non-value-added operations.
 - Streamline and simplify systems, processes, and operations.
 - Perform Root Cause Analysis.
 - Reduce process time.
 - Evaluate staffing requirements and staff productivity.
- Conduct Lean Six Sigma training courses and workshops.

EDUCATION

Doctor of Engineering in Industrial and Manufacturing Engineering May 2001

Cleveland State University, Cleveland, OH

Dissertation topic: *A genetic algorithm for minimizing the total weighted tardiness in a job shop*

Master of Science in Industrial and Manufacturing Engineering, March 1998

Cleveland State University, Cleveland, OH

Concentration: *Quality engineering*

Bachelor of Science in Chemical Engineering January 1995

University of Jordan, Amman, Jordan

CERTIFICATES

- **King Abdullah II Award Certified Assessor.** Accredited by the KACE May 2013
- **EFQM Certified Assessor.** Accredited by the EFQM June 2012
- **Basics of Supply Chain Management.** Accredited by the APICS June 2012
- **Six Sigma Black Belt.** Accredited by the American Society for Quality (ASQ) October 2010
- **Lean Enterprise II.** Accredited by the Institute of Industrial Engineers (IIE) January 2005
- **Six Sigma Green Belt.** Accredited by the Institute of Industrial Engineers(IIE) September 2003

TRAINING / CONSULTATION EXPERIENCE

- **Introduction to Lean Six Sigma training** Jordan Society for Quality & Jordan Investors Society, Amman, Jordan
 - Offered twenty hours of hands-on training in LSS.
- **Introduction to Lean Six Sigma training** Ministry of Health, Amman, Jordan
 - Offered twenty hours of hands-on training in LSS.
- **Introduction to Lean Six Sigma training** King Fahd Hospital, Tabuk, KSA
 - Offered thirty hours of hands-on training in LSS.
- **Lead a team for KPI Selection and Development** King Abdulaziz University Hospital, Jeddah, KSA
- **Lean Six Sigma Green Belt training** Ministry of Health, Riyadh, KSA
 - Offered over forty hours of hands-on training in LSSGB.
- **Lean Six Sigma Black Belt training** Petra Aluminum , Amman, Jordan
 - Offered over sixty hours of hands-on training in LSSBB.
- **Lean Six Sigma Green Belt** Center of Consultation, University of Jordan, Amman , Jordan
 - Offered forty hours of hands-on training in LSSGB.
- **Lean Six Sigma Yellow Belt** University of Jordan, Amman , Jordan
 - Offered twenty hours of hands-on training in LSSGB.

- **Introduction to Six Sigma** University of Jordan & Jordan Society for Quality, Amman, Jordan
 - Offered part of the Quality Management and Excellence Diploma
- **Design of Experiments** UJ & JSQ, Amman, Jordan
 - Offered part of the Quality Management and Excellence Diploma
- **Introduction to Lean Six Sigma** Jordan Engineers Association
 - Offered short a course in LSS.

PROJECT/RESEARCH EXPERIENCE

Assistant Professor

September 2009–Present

Industrial Engineering Department, University of Jordan

Quality Improvement Projects/Jordan Healthcare Sector

- **Dermatology Clinic, The University of Jordan Hospital**, Amman, Jordan.
 - Reducing Patient Waiting Time using Six Sigma methodology and Computer Simulation.
 - Implementing Lean concepts such as five S and value stream mapping.
 - Conducting time studies.
- **Outpatient Pharmacy, King Hussain Cancer Center**, Amman, Jordan.
 - Reducing Prescription Preparation Time using Six Sigma methodology and Computer Simulation.
 - Implementing Lean concepts such as five S and value stream mapping.
 - Conducting time studies.
 - Evaluating staffing requirements.
- **Specialty Hospital**, Amman, Jordan.
 - Implementing Six Sigma Methodology to reduce discharge times for patients.
 - Standardization of operations and tasks for hospital staff.
 - Staffing Optimization & nurse productivity.

Quality Improvement Projects/Jordan Educational Sector

- **Al–Ridwan Schools**, Amman, Jordan.
 - Improving the quality of teaching in the English Language Department for grades one through three by implementing Six Sigma tools.

Quality Improvement Projects/Jordan Government Service Sector

- **Industrial Development Directorate, Ministry of Industry and Trade**, Amman, Jordan.
 - Reengineering of Mail document Workflow Process.
- **Central Trade & Industrial Registration Directorate, Ministry of Industry and Trade**, Amman, Jordan.
 - Improving the performance of the directorate using Six Sigma Methodology.
 - Staffing Optimization.
- **Greater Amman Municipality**, Amman, Jordan.
 - Occupancy Permit Lead Time reduction using Six Sigma Methodology at Greater Amman Municipality.

Quality Improvement Projects/Jordan Industrial Sector

- **Petra Aluminum Co.**, Amman, Jordan.
 - Conduct in–house training for 20 staff members.
 - Leading the implementation of several Lean Six Sigma projects throughout the company.
 - Identify and prioritize projects (areas of improvements)
 - Process Flowcharting.
 - Identify and diagnose value–added and non–value–added operations.
 - Streamline and simplify systems, processes, and operations.
 - Assist in analyzing Employee Opinion Survey.
- **Al-Jada' Engineering Industries Co**, Amman, Jordan.
 - Implementing Lean concepts such as five S and value stream mapping.
 - Facility Re-Layout to improve production and minimize waste.

- **Hikma Pharmaceuticals**, Amman, Jordan.
 - Optimization of container usage.
 - Optimization of routing alternatives.
- **Unichem**, Amman, Jordan.
 - Performing Time & motion/Work measurement study.
 - Performing Facilities Layout study.

Senior Research Associate

October 2003–December 2008

Center for Sustainable Mobility, Virginia Tech Transportation Institute

Microscopic Analysis of Traffic Flow in Inclement Weather (Co-Principal Investigator)

Sponsored by Federal Highway Administration (FHWA)

- Review and summarize existing research, data and analytical procedures related to driver behavior on freeways and arterial roads during inclement weather
- Develop and implement a methodology for identifying and modeling microscopic driver/roadway/vehicle parameters that are influenced by weather conditions for both freeways and arterials
- Recommend procedures for incorporating results of the study into existing traffic microsimulation models

Modeling Alternative Lane Management Strategies I-81

Sponsored by Virginia Department of Transportation (VDOT) and the Mid-Atlantic University

Transportation Center (MAUTC)

- Review and summarize existing research, data and analytical procedures related to driver behavior on freeways and arterial roads during inclement weather
- Develop and implement a methodology for identifying and modeling microscopic driver/roadway/vehicle parameters that are influenced by weather conditions for both freeways and arterials
- Recommend procedures for incorporating results of the study into existing traffic microsimulation models
- Develop vehicle dynamics models for modeling truck acceleration behavior
- Model the interaction of trucks and automobiles
- Enhances the Highway Capacity Manual truck performance curves
- Evaluates the safety hazard of I-81
- Evaluates alternative lane and truck management strategies.

Safety Benefit Evaluation of a Forward Collision Warning System (Co-Principal Investigator)

Sponsored by the National Highway Traffic Safety Administration (NHTSA)

- Estimate the safety benefits of the Eaton VORAD Forward Collision Warning System using data collected during the Drowsy Driver Warning System Warning System Field Operational Test

Empirical Studies on Traffic Flow in Inclement Weather

Sponsored by Federal Highway Administration (FHWA), the Virginia Department of Transportation (VDOT), and the Mid-Atlantic University Transportation Center (MAUTC)

- Perform statistical analysis to study the impact of precipitation and visibility on macroscopic traffic flow indicators over a full range of traffic states
- Develop analytical models to account for inclement weather impacts on roadway capacity and free-flow speed
- Investigate the potential for regional differences in precipitation impacts

Calibration of Car-Following and Traffic Stream Steady-State Models

- Comparing the performance of the automated procedure to off-the-shelf optimization softwares and solvers including Ample/MINOS, BARON, and Excel solvers using different formulation and solution techniques.

The Reliability of Trip Travel Estimations

- Applying statistical analysis tools to determine the probability distributions that model travel time fluctuations along freeway corridors to predict travel times.

The ITS Implementation project “Addressing VDOT Surveillance Needs”

- Developed a genetic algorithm for locating automatic vehicle identification tag readers for the purpose of estimating dynamic roadway travel times.

The I-81 Planning study

- Compared alternative truck management strategies along one of the most highly traveled sections of I-81 in the state of Virginia.

Research Associate (Digital Ships Lab Manager)

May 2001–Oct. 2003

Engineering Science & Mechanics Department, Virginia Polytechnic Institute and State University

Funded by: Navy Collaborative Integrated Information Technology Initiative

- Established the Digital Ships Laboratory (DSL). The DSL is a digital test bed to develop, demonstrate, evaluate, and test advanced shipboard command & control technology
- Oversaw the establishment of the Computing and Visualization clusters for the DSL
- Collaborated and coordinated with other managers to ensure cooperation between departments
- Lead a team of programmers, produced plans and executed specific job responsibilities to ensure that deliverables were met
- Communicated and enforced priorities for the team
- Prepared reports and was a lead participant in demos
- Implementation of DS³ Real time input module in MATLAB/Simulink
- Among the projects overseen:
 - Enhancement of the performance of the Benchmark new generation.
 - The design and implementation of a Generic Environment Model of Digital Ships (GEMDS)

Doctoral Research

Sep. 1999–May 2001

- Dissertation topic: A Genetic Algorithm for Minimizing the Total Weighted Tardiness in a job shop
- Performed extensive research on scheduling operations in a job shop
- Implemented statistical techniques, such as Fractional Factorial Design and Analysis of Variance to determine the optimum Genetic Algorithm's parameters
- Developed a C++ computer program (scheduler) to minimize the total weighted tardiness in a job shop

Graduate Project Assistant

Jan. 1999–Sept. 1999

General Motors Human Machine Interface Project

A member in the team that:

- Evaluated existing human machine interface system, (Panel View and Panel Builder with Allen-Bradley PLC 5) and developed improvements
- Prepared system design using Unified Modeling Language
- Created control screens using Visual Basic

Masters Project

Summer 1997

Implementation of ISO 9000/QS9000

- Conducted an evaluation study for QS9000 certification for a local company
- Reviewed company's quality manuals
- Interviewed shop–floor workers and prepared documentation for the different processing steps
- Provided suggestions, proposals and recommended plans to management to assure acquirement of QS 9000 certificate
- Prepared and wrote ISO 9002 procedures

TEACHING EXPERIENCE

Assistant Professor

University of Jordan

Courses: Advanced Engineering Statistics (IE 0936702)
 Marketing Engineering (IE0906527)
 Special Topics (IE0946501): Lean Six Sigma
 Operations Research II (IE 0936552)
 Logistics and Supply Chain Management (IE 906525)
 Human Factors Engineering (IE 906481)

September 2009–Present

Industrial Engineering Department

graduate level
 undergraduate level
 undergraduate level
 undergraduate level
 undergraduate level
 undergraduate level

Motion and Time Studies (IE0906384)	undergraduate level
Engineering Statistics II (IE 0906355)	undergraduate level
Engineering Statistics I (IE 0936251)	undergraduate level

Part time Instructor**University of Jordan**

Courses: Engineering Statistics (IE 0936251)

Human Factors Engineering (IE 906481) – undergraduate level

February 2009–August 2009**Industrial Engineering Department**

undergraduate level

Part time Instructor**German Jordanian University**

Courses: Engineering Statistics (Math251)

Engineering Economics (IE 353)

Safety and Ergonomics (IE 561)

February 2009–Present**Industrial and Management Systems Engineering**

undergraduate level

undergraduate level

undergraduate level

Adjunct Faculty**Virginia Polytechnic Institute and State University**

Courses: Optimization II (ISE 5406)

Operations Research (ISE 5104)

Deterministic Operations Research (ISE 2404)

Introduction to Manufacturing Processes (ISE 2204)

September 2002–June 2005**Grado Dept. of Ind. and Sys. Eng.**

graduate level

graduate level/video conferencing

undergraduate level

undergraduate level

Invited Lecturer*Virginia Polytechnic Institute and State University* Charles Edward Via, Jr. Dept. of Civil & Env. Eng.

Topic: Regression Analysis

Fall 2006**Instructor****Cleveland State University**

Courses: Engineering Economy (ESC282)

Engineering Probability and Statistics (ESC310)

Spring 1998–Spring 2001**Ind. & Manufacturing. Eng. Dept.**

undergraduate level

undergraduate level

PUBLICATIONS**Refereed Journal Publications**

- Rakha H., **Arafeh M.**, and Park S. (2012), "Modeling Inclement Weather Impacts on Traffic Stream Behavior", *International Journal of Transportation Science and Technology*. Volume 1, No. 1, p. 25–48.
- Rakha H., El-Shawarby I., and **Arafeh M.** (2010), "Trip Travel-Time Reliability: Issues and Proposed Solutions," *Journal of Intelligent Transportation Systems*. Volume 14, Issue 4, p. 232–250.
- Rakha, H., Fitch, G., **Arafeh, M.**, Blanco, M., and Hanowski, R. (2010), "Safety Benefit Evaluation of a Heavy Vehicle Forward Collision Warning System", *Transportation Research Record: Journal of the Transportation Research Board*. No. 2194, p 44–54.
- Rakha, H. and **Arafeh, M.**, (2009) "Calibrating Steady-State Traffic Stream and Car-following Models using Loop Detector Data", *Transportation Science*. DOI: 10.1287/trsc.1090.0297, P 1-18
- Rakha, H., Farzaneh, M., **Arafeh M.**, and Sterzin, E. (2008), "Inclement Weather Impacts on Freeway Traffic Stream Behavior", *Transportation Research Record: Journal of the Transportation Research Board*, No. 2071, p 8-18.
- Medina Flintsch, A., Rakha, H., **Arafeh, M.**, Dua, D., Abdel-salam, A., and Abbas, M. (2008), "Safety Impacts of Access Control Standards on Crossroads in the Vicinity of Highway Interchanges", *Transportation Research Record: Journal of the Transportation Research Board*, No. 2075, p 42-52.
- Rakha H., Medina A., Ahn K., El-Shawarby I., and **Arafeh M.** (2005), "Evaluating Alternative Lane Management Strategies along I-81", *Transportation Research Record: Journal of the Transportation Research Board*, No. 1925, p 76-86.

Fully Refereed Conference Publications

- Rakha, H., El-Shawarby, I. Park, S. and **Arafeh, M.**, (2010) "Modeling Framework for the Evaluation of Alternative Truck Lane Management Strategies," 13th International IEEE

Conference on Intelligent Transportation Systems (IEEE ITSC10), pp. 1025-1032, September 19 - 22, 2010. Madeira Island, Portugal.

- Rakha, H., **Arafeh M.**, Abdel-salam, A., and Medina Flintsch, A., (2008) "Linear Regression Crash Prediction Models: Issues and Proposed Solutions", *Efficient Transportation and Pavement Systems: Characterization, Mechanisms, Simulation and Modeling*, Taylor and Francis, ISBN: 978-0-415-48979-9 (Hand Book), ISBN: 978-0-203-88120-0 (Electronic Book), pp. 241-256.
- Rakha, H. and **Arafeh, M.** (2007) "Tool for Calibrating Steady-State Traffic Stream and Car-following Models", the 86th Transportation Research Board Annual Meeting, Jan. 22-25, Washington D.C.
- **Arafeh M.** and Rakha, H., (2005), "Genetic algorithm approach for locating automatic vehicle identification readers", the 8th IEEE International Conference on Intelligent Transportation Systems (IEEE ITSC05), p 1153-1158. September 13-16, Vienna, Austria.
- Rakha, H., El-Shawarby, I., **Arafeh M.**, and Dion, F., "Estimating Path Travel Time Reliability," the 9th International IEEE Conference on Intelligent Transportation Systems (IEEE ITSC06), September 17-20, 2006, Toronto, Canada.

Conference Publications

- Rakha, H., **Arafeh M.**, Abdel-salam, A., and Medina Flintsch A. (2008), "Linear Regression Crash Prediction Models: Issues and Proposed Solutions", the 87th Transportation Research Board Annual Meeting, Jan. 13-17, Washington D.C.
- Rakha H., Medina Flintsch A., Ahn K., El-Shawarby I., and **M. Arafeh**, (2005) "Evaluating Alternative Management Strategies along I-81" Transportation Research Record 84th Meeting, Washington D.C., CD-ROM [Paper 05-2086].
- **Arafeh M.** and Svestka, J, "Applying DOE in genetic algorithm parameters determination" presented at the 2002 INFORMS Annual Meeting, San Jose, California.

Presentations

- "Safety Benefit Evaluation of a Forward Collision Warning System" presented to National Highway Traffic Safety Administration, Dec. 4, 2007, Washington D.C.
- "Empirical Studies on Weather and Traffic Flow" presented to Transportation Research Board Freeway Operations Sub-Committee of the Highway Capacity and Quality of Service Committee at the 86th Transportation Research Board Annual Meeting, Jan. 22-25, Washington D.C.
- "Center for Sustainable Mobility Overview and Selected Projects" presented to a delegation from TransConsult, Company, Bangkok, Thailand.

Reports

- Rakha, H., Park, S., **Arafeh, M.**, and El-Shawarby I., "Evaluation of Alternative Truck Lane Management Strategies Along a Section of I-81", submitted to Virginia Department of Transportation, May 19, 2008.
- Rakha, H., Medina Flintsch A., **Arafeh, M.**, Abdel-salam, A., Dua, D., and Abbas, M., "Access Control Design on Highway Interchanges", submitted to Virginia Transportation Research Council (VTRC 08-CR7) January 2008.
- Fitch, G., Rakha, H., **Arafeh, M.**, Blanco, M., Gupta, S., Zimmermann, R., Hanowski, R., "Safety Benefit Evaluation of a Forward Collision Warning System" submitted to National Highway Traffic Safety Administration, Dec. 4, 2007, Washington D.C.
- Hranac R., Sterzin E., Krechmer D., Rakha H., Farzaneh M., and **Arafeh M.** (2006), "Empirical Studies on Traffic Flow in Inclement Weather," FHWA-HOP-07-073.
- Rakha H., Medina A., Ahn K., El-Shawarby I., and **Arafeh M.** (2003), "Simulation Study of the Roanoke/Blacksburg Section of I-81", Report submitted to the Virginia Department of Transportation

Work in Progress

- **Arafeh, M.**, M. Barghash, A. Al-Samhoory, E., and D. Tahboob, "Lean Six sigma and discrete event simulation applied to reduce waiting times in a cancer pharmacy"
- **Arafeh M.** and Rakha, H, "Systematic Analysis of GA Parameter's Effect on GA Performance".
- **Arafeh M.** and J. Svestka, "A general approach for determination of optimal genetic algorithm parameters".
- **Arafeh M.** and J. Svestka, "Genetic algorithm for minimizing the total weighted tardiness in a job shop".

ACADEMIC ADVISING

- Chair –M.S. Degree: 1 in progress.
- Co-Chair – M.S. Degrees: 1 in progress, 1 completed.
- Committee Member – Ph.D. Degrees: 1 completed
- Committee Member – M.S. Degrees: 1 completed.

BOOKS REVIEWED

- Operation Research: an Introduction, by Hamdy Taha.7th ed. Review for Prentice Hall

PROFESSIONAL EXPERIENCE

Quality Engineer

May 1995–August 1996

International Ceramic Industrial Company, Mafrqa, Jordan

- Participated in the startup stage of a ceramic plant
- Set up the quality control laboratory including equipment layout
- Oversaw the preparation of the first batch of production
- Applied SPC and other quality tools in day-to-day operations
- Conducted experiments on product formulation to meet product specifications
- Established quality standards and test procedures
- Trained and supervised 11 quality control technicians for the laboratory
- Conducted quality training for online production workers
- Performed quality tests online and in the laboratory
- Assisted Italian and Spanish experts in trouble shooting and solving problems on the production line
- Examined new procedures, and made the necessary changes and adjustments

Sales Engineer

Jan. 1995–May1995

Diamond Coat Division and Project Development Division, Cartell Group, Amman, Jordan

- Worked with customers to determine their needs and recommended company products
- Assisted senior development engineers in the development of new production methods and procedures for implementation in customers' facilities

COMPUTER SKILLS

Statistical packages: SAS, Minitab, SPSS, JMP

Modeling languages: AMPL, MPL, GAMS, LINGO

Optimization solvers: ILOG CPLEX, LINDO/LINGO API, MINOS, CONOPT, Excel Solver

Traffic simulation software: INTEGRATION

Simulation packages: ARENA, Crystal Ball (Monte Carlo simulations)

Other: Matlab, Access, C, C++, Visual Basic

PROFESSIONAL AFFILIATIONS

- European Foundation For Quality (EFQM) June 2012
- American Production and Inventory Control Society (APICS) May 2012
- American Society for Quality (ASQ) June 2010
 - Elected Country Counselor.
- Transportation Research Board (TRB) October 2004
- INFORMS August 2002
- Institute of Industrial Engineers (IIE) October 1998
- Tau Beta Pi May 1998
- Jordan Engineers Association March 1995

REFERENCES

References are available upon request