

Babak Haji

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Education:

Ph.D., Industrial and Systems Engineering

University of Southern California (USC), May 2015

Dissertation: Queueing Loss System with Heterogeneous Skill Based Servers and Discriminating Arrivals

Advisor: Professor Sheldon M. Ross

M.S., Industrial Engineering

Sharif University of Technology, June 2010

B.S., Industrial Engineering

Sharif University of Technology, June 2008

Academic Experience:

Assistant Professor, Department of Industrial Engineering, Sharif University of Technology. (September 2017 - Present)

- Teaching graduate and undergraduate level courses: **Project Scheduling, Advanced Stochastic Processes, Production Planning and Inventory Control I.**
- Studying a queueing loss model having multiple server pools with application to hospital wards and data centers.

Postdoctoral Research Scientist, Department of Industrial Engineering and Operations Research, Columbia University. (January 2016 - January 2017)

- Modeling, analysis, and control of patient flow in the emergency department of Columbia Medical School. Utilizing data driven analysis and efficient simulation modeling to identify bottlenecks and to provide proper staffing levels (physicians, nurses, transportation personnel, etc.), policy improvements, and design changes. Provided a user friendly interface using C++ for the simulation model, so physicians can easily change the inputs to predict the daily staffing requirements of the ED or any other unusual circumstances.

- Empirical study of the effect of patient to physician ratio on patient length of stay (LOS) in emergency departments. Utilized data mining methods and econometric cost analysis to improve criteria such as LOS and ambulance diversion.
- Capacity planning for hospital inpatient wards using simulation and data analysis.

Visiting Assistant Professor, Department of Systems and Industrial Engineering, University of Arizona. (August 2015 - December 2016)

- Taught graduate and undergraduate courses including **Engineering Statistics** and **Queueing Theory**.
- Studying optimization problems related to whether or not to admit arrivals to a queueing system.

Adjunct Lecturer, Graziadio School of Business and Management, Pepperdine University. (Summer 2015)

- Taught a graduate level course called **Advanced Statistical Tools** covering regression analysis, multivariate analysis of variance (MANOVA), discriminant analysis, logistic regression, factor analysis, and cluster analysis.

Teaching Assistant, Dept. of Industrial and Systems Engineering, University of Southern California, for the following graduate courses: **Stochastic Process, Simulation, Financial Engineering, Value and Decision Theory**. (2011 - 2014)

Teaching Assistant, Dept. of Industrial Engineering, Sharif University of Technology, for: **Engineering Statistics**. (2008 - 2010)

Research Assistant, Dept. of Industrial and Systems Engineering, University of Southern California (2010 - 2015)

- Studied queueing loss systems with heterogeneous skill based servers which resulted in two published papers. This study is motivated by its applications in communication networks, call centers, data centers, and bed capacity planning of hospital wards.
- Analyzed an $M/G/\infty$ queueing system with exponentially distributed setup times which resulted in a published paper. Setup times are common in manufacturing systems, data centers, and service centers. There are two different costs associated with setups, one is the increase in mean response time and second is the waste of energy due to the more energy consumption during this period.

- Gained extensive experience in computer programming and in applying simulation methods.

Research Assistant, Dept. of Industrial Engineering, Sharif University of Technology (2008 - 2010)

- Analyzing and optimizing different inventory models which resulted in several published papers.

Teaching Interest:

Stochastic Processes, Queueing Theory, Advanced Stochastic Processes, Simulation, Introduction to Probability Models, Stochastic Dynamic Programming, Value and Decision Theory, Financial Engineering, Engineering Statistics, Advanced Statistical Tools.

Research Interest:

Queues: Routing policies, skill based servers, heavy-traffic theory, stochastic networks, and applications to: health systems, communications network, manufacturing systems, and service systems.

Probability and Stochastic Models: Decision making under uncertainty, stochastic dynamic programming, simulation.

Supply Chain Management: Stochastic inventory models, service and health care operations (including waiting lines and location issues), applications of optimization models.

Publications:

Refereed Journal Publications:

- Haji, B. and S.M. Ross. (2018). Minimizing Expected Discounted Cost in a Queueing Loss Model with Discriminating Arrivals. *Working Paper*.
- Haji, B. and S.M. Ross. (2015). A Queueing Loss Model with Heterogeneous Skill Based Servers under Idle Time Ordering Policies. *Journal of Applied Probability* 52: 269-277.
- Haji, B. (2015). On the Adan-Weiss Loss Model having Skill-Based Servers and Longest Idle Assignment Rule. *Probability in the Engineering and Informational Sciences* 29: 181-189.

- Haji, B. and S.M. Ross. (2015). $M/G/\infty$ with Exponentially Distributed Setup Times. *Operations Research Letters* 43: 26-28.
- Haji, B. and A. Haji. (2011). A Queueing-Inventory System with Repair Center for Defective Items and One-for-One Ordering Policy. *Journal of Industrial and Systems Engineering* 5: 230-239.
- Haji, R., Tayebi, H., Haji, B. (2011). Applying a new ordering policy in a two-echelon inventory system with Poisson demand rate for retailers and transportation cost. *Int. J. Business Performance and Supply Chain Modeling* 3: 20-27.
- Haji, R. and B. Haji. (2010). Optimal Batch Production for a Single Machine System with Accumulated Defectives and Random Rate of Rework. *Journal of Industrial and Systems Engineering* 3: 243-256.
- Haji, B., Haji, A., Tavakol, A. (2008). Scheduling Accumulated Rework in a Normal Cycle: Optimal Batch Production with Minimum Rework Cycles, *Journal of Industrial and Systems Engineering* 2: 236-249.

Conference Publications:

- Haji, B., Haji, R., Haji, A. Optimal Batch Production with Rework and Non-Zero Setup Cost for Rework. *Proceedings of CIE 39th International Conference on Computers & Industrial Engineering*. Troyes, France, July 2009. pp.869-874.
- Haji, R., Haji, B., Haji, A. Optimal Batch Production with Minimum Rework Cycles and Constraint on Accumulated Defective Units. *Proceedings of IEEE International Conference on Service Operations, Logistics and Informatics*. Chicago, IL, USA. July 2009. pp. 633-638.
- Haji, B. and A. Haji. One-for-One Period Policy in a Two-echelon inventory system with Poisson demand and Constraint on Total Lost Sales. *Proceedings of IEEE International Conference on Service Operations, Logistics and Informatics*. Chicago, IL, USA. July 2009. pp. 74-77.
- Haji, R., Haji, B., Haji, A. Optimal Ordering Policy in a Two-Level Supply Chain with Budget Constraint. *The 2nd International Multi-Conference on Engineering and Technological Innovation: IMETI 2009*. Orlando, Florida, USA. July 2009. pp.265-269.
- Haji, B., Ghayoor, Z., Haji, A. Economic Batch Quantity with Random Defectives and Rework. *International Conference on Industrial Engineering and Systems Management IESM07*. Beijing, China. June 2007.

- Haji, R., Ghayoor, Z., Haji, B. Economic Batch Quantity with Setup Time for Immediate and Delayed Rework. *Proceedings of the 2007 Industrial Engineering Research Conference*. Nashville, Tenn. USA . May 2007.

Professional Activities:

Reviewer: Probability in the Engineering and Informational Sciences (*PEIS*), OPSEARCH.

Presentations:

- *M/G/∞ with Exponentially Distributed Setup Times*. IIE Annual conference (2015).
- *A Queueing Loss Model with Heterogeneous Servers and Discriminating Arrivals*. West Virginia University, Morgantown (2015).
- *Analysis of Multi-Server Queues: Applications of the Reverse Chain*. Stevens Institute of Technology (2015).
- *M/G/∞ with Exponentially Distributed Setup Times*. INFORMS Annual meeting (2014).
- *A Queueing Loss Model with Heterogeneous Skill Based Servers under Idle Time Ordering Policies*. INFORMS Annual meeting (2013).
- *A Queueing-Inventory System with Defective Items and Poisson Demand*. CIE-41th (2011).
- *Optimal Batch Production with Rework and Non-Zero Setup Cost for Rework*. CIE-39th (2009).

Awards and Honors:

Iran Nationwide University Entrance Exam (2003)

Ranked 1901th among more than 400'000 students.

Iran Nationwide Graduate Entrance Exam (2008)

Ranked 17th among more than 10'000 students.

Viterbi School of Engineering Doctoral Fellowship (2010 - 2011)

Viterbi School of Engineering Best Doctoral Dissertation Award (2015)

Industry Experience:

Iran Khodro Aluminum Forging Inc. (Abhar/Iran, Aug-Sep, 2007)

Iran Khodro Aluminum forging supplies engine equipments for the largest automobile company (Iran Khodro) in Iran. (Supervised a team of 5 staff for Time and Motion Study)

Sinjer Gas (Tehran/Iran, Mar-Aug, 2007)

Sinjer Gas produces refrigerators, air conditioner, and stoves. (Managed a team of 7 staff for Time and Motion Study and Production Scheduling)

Omran Omid Rai Inc. (Tehran/Iran, May-Aug, 2005)

Omran Omid Rai is a construction company which builds structure including public libraries, shopping centers, bridges, etc. (Summer Internship - worked as an assistant project manager)

Computer Skills:

Lingo, GAMS, Visual Studio, MSP, AutoCAD, Mechanical Desktop, Maple, MS Office, Pascal, Vensim, CPLEX, Matlab, JMP, SAS, JMP, R.

References:

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