

# SAMIRA FALLAH

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## STATUS

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U.S. Permanent Resident (Green Card Holder)

## SUMMARY

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Professional Operations Research Scientist with a demonstrated history of working in mathematical programming and optimization, design of algorithms, discrete-event simulation modeling and analysis, machine learning algorithms, reinforcement learning algorithms, data mining on large datasets, and nonlinear optimization to solve challenging scientific and business problems. Skilled in C++, Python.

## EDUCATION

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Lehigh University, Bethlehem, Pennsylvania, USA August 2018 - expected May 2023  
**Ph.D. in Industrial and Systems Engineering** GPA: 3.92/4  
Thesis Title: A Method of Constructing the Efficient Frontier by Exploiting the Value Function  
Advisors: Prof. Lawrence V Snyder and Prof. Ted Ralphs

Sharif University of Technology, Tehran, Iran August 2015 - June 2017  
**M.Sc. in Industrial Engineering** GPA: 18.28/20.00  
Thesis Title: A Tabu Search Algorithm for Order Acceptance and Scheduling Problems  
Advisor: Prof. Farhad Kianfar

Sharif University of Technology, Tehran, Iran August 2011 - June 2015  
**B.Sc. in Industrial Engineering** GPA: 17.89/20.00  
Thesis Title: A Literature Review of Disruption and Sustainability in Supply Chains  
Advisor: Prof. Mohammad Reza Akbari

## EXPERIENCES

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**Operations Research Consultant.** *Arkema, USA, Summer 2021.*  
Developed a new mathematical model for scheduling products to maximize the volume of orders fulfilled (Coded in Python and called GuRoBi optimizer).

**Ph.D. Researcher.** *Lehigh University, USA, August 2018 - Ongoing.*  
Considering an approach for constructing the efficient frontier for a general multi-objective MILP problem.

## RESEARCH INTERESTS

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**Applied Operations Research:** Decomposition-based Algorithms, Integer Programming, Combinatorial Optimization, Computational Optimization, Stochastic Modeling and Optimization, Nonlinear Programming, Parallel Computing.

With applications in: Transportation, Location and Network Problems, Production Planning, Sequencing and Scheduling, Logistics, Supply Chain.

## SELECTED COURSES

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### Lehigh University:

Optimization Methods in Machine Learning, Discrete Optimization, Mathematical Optimization, Applied OR, Convex Analysis, Nonlinear Optimization, Random Processes and Applications, Mining of Large Datasets, Computational Methods in Optimization, Stochastic Models and Applications, Principle and Practice of Parallel Computing.

### Sharif University of Technology:

Dynamic Systems, Nonlinear Programming, Dynamic Programming, Design and Analysis of Experiments, Integer Programming, Production Planning, Discrete Events Simulation, Regression Analysis, Facility Design and Planning, Design and Analysis of Experiments, Probability Theory & its Applications, Operations Research I, Operations Research II.

### Coursera Online Course:

Python Data Structures, Using Databases with Python.

## AWARDS AND HONORS

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- Awarded GHC Student Scholarship to attend the 2021 Grace Hopper Celebration
- Dean's Doctoral Student Assistantship, Lehigh University, 2019-2020 and 2020-2021
- Received Lehigh University Fellowship, 2018-2019
- Ranked 5<sup>th</sup> in cumulative GPA among 2017 graduate students of Sharif University of Technology
- Ranked 4<sup>th</sup> in cumulative GPA among 2015 undergraduate students of Sharif University of Technology
- Fellowship from Sharif University of Technology in bachelor's and master's degree, 2011 and 2015
- Having the privilege of being exempted from M.Sc. entrance exam as an "Exceptionally Talented" student, 2014
- Ranked 259<sup>th</sup> among 350'000 students in Iran's Nationwide University Undergraduate Entrance Exam, 2011

## TALKS

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A Branch-and-Price Algorithm for Combined Location and Routing Problems Under Capacity Restrictions, INFORMS Annual Meeting, Nov. 2020

## TEACHING ASSISTANTSHIP EXPERIENCES

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### Lehigh University, ISE Department

- Logistics and Supply Chain Management, instructed by Prof. Snyder, Spring 2020 and 2021.
- Engineering Probability and Statistics, instructed by Prof. Storer, Fall 2019 and 2020.

### Sharif University of Technology, IE Department

- Operation Research II, instructed by Prof. Modarres, Fall 2015 and Spring 2016.

## RESEARCH EXPERIENCES AND PROJECTS

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### Lehigh University, Bethlehem, Pennsylvania, USA

- **A review of cloud operations research problem:** December 2020  
Reviewed a Placement, Provisioning, and Packing problem in cloud computing.
- **A review of Metropolis-Hastings Algorithm:** December 2020  
Implemented and reviewed a Metropolis-Hastings algorithm in Markov Chain Monte Carlo Class.
- **Reinforcement learning for a smart grid game:** May 2020  
Implemented a reinforcement learning algorithm with an actor-critic framework for a smart grid game.

- **Neural style transfer:** May 2020  
Implemented a neural style transfer algorithm for generating an artistic image by combining a content image and a style image.
- **Algorithms for solving the Maximum Weighted Bipartite Matching Problem:** December 2019  
Implemented Galil's algorithm and Hungarian algorithm and compared with IP and LP model solved with CPLEX optimizer.
- **Analyzed the trending videos information from YouTube:** December 2019  
Experienced working with data mining on large datasets ("big data") and clustered and classified Youtube videos by using Apache Spark computing framework.
- **Used logical surrogate information in Lagrangian relaxation:** May 2019  
Compared the Lagrangian algorithm and surrogate Lagrangian for the *Traveling Salesman Problem* (TSP).
- **Package for unconstrained nonlinear optimization :** May 2019  
Implemented a line search and trust-region-based optimization package for unconstrained nonlinear optimization in MATLAB.
- **A review of Chubanov's algorithm vs. Relaxation method:** December 2018  
A comprehensive literature review on Chubanov's algorithm and Relaxation method.

### Sharif University of Technology, Tehran, Iran

- **Order Acceptance and Scheduling Problem:** June 2017  
Designed and implemented a Tabu Search algorithm for solving the order acceptance and scheduling problem, Master's Thesis.
- **Reliability Redundancy Allocation Problem:** December 2016  
Studied and presented an exact algorithm for solving the reliability redundancy allocation problem.
- **Augmented Lagrangian:** May 2016  
Studied Global Minimization using an Augmented Lagrangian Method with variable lower-level constraints.
- **Simulation:** May 2015  
Built a simulation model of the queuing system in the airport to evaluate the average time that passengers are in the system and the service rate for each server, (Coded in C#).
- **An Application Program for a Dining Company:** December 2014  
Implemented an application for a dining company, (Coded in VB).
- **Plant Layout:** May 2014  
Optimized facility design and plant layout for ABARA company.

### COMPUTER SKILLS

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<b>Programming languages</b>	Python, C/C++, MATLAB, Bash scripting, C#, SQL.
<b>Parallel Computing</b>	Experience with MPI and TBB.
<b>Machine Learning Libraries</b>	NumPy, MapReduce, Spark.
<b>Mathematical modeling</b>	Pyomo, AMPL, GAMS.
<b>Optimization solvers</b>	Coin-OR, CPLEX, GUROBI.
<b>Statistics and Probability Software</b>	SAS, R.

### PROFESSIONAL MEMBERSHIPS

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<b>INFORMS (Institute for Operations Research and Management Sciences)</b>	2019-Present
<b>AnitaB.org Grace Hopper Celebration</b>	2021-Present

### LANGUAGES

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**Persian** (Native), **English** (Fluent).

## REFERENCES

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**Lawrence V Snyder**, Professor, Lehigh University. (lvs2@lehigh.edu)

**Ted Ralphs**, Professor, Lehigh University. (ted@lehigh.edu)

**Farhad Kianfar**, Professor, Sharif University of Technology. (fkianfar@sharif.edu)

**Hashem Mahlooji**, Professor, Sharif University of Technology. (mahlooji@sharif.edu)

**Seyed Taghi Akhavan Niaki**, Professor, Sharif University of Technology. (niaki@sharif.edu)