# Ali Eshragh                                    *Curriculum Vitae*

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| CONTACT INFORMATION | Carey Business School<br>Johns Hopkins University<br>Washington, D.C., United States | Ali.Eshragh@jhu.edu |

WEBSITE

Homepage
Google Scholar
LinkedIn

CURRENT POSITION

Associate Professor in Business Analytics and Operations Management

Carey Business School
Johns Hopkins University, United States

RESEARCH AFFILIATION

International Computer Science Institute (ICSI)       Big Data Research Group
University of California at Berkeley, United States

The Australian Research Council Center of Excellence       Associate Investigator
for Mathematical and Statistical Frontiers (ACEMS)
University of Melbourne, Australia

RESEARCH INTERESTS

Advanced Computing (Data Processing and Analysis Techniques), Artificial Intelligence (Machine Learning and Reinforcement Learning), Probabilistic Operations Research (Statistical Modeling and Stochastic Optimization), Business Analytics (Supply Chain Analytics)

EDUCATION

University of South Australia, Australia                                    August 2011

Ph.D. in Applied Mathematics, Stochastic Operations Research
Minor Applied Probability and Optimization

- Thesis Topic: *Hamiltonian Cycles and the Space of Discounted Occupational Measures*

Sharif University of Technology, Iran                                    January 2004

M.Sc. in Industrial Engineering, Stochastic Operations Research
Minor Statistical Modeling and Stochastic Optimization – GPA: 89.0%

- Thesis Topic: *Application of Decision on Beliefs in Response Surface Methodology*

Sharif University of Technology, Iran                                    September 2001

B.Sc. in Industrial Engineering , Stochastic Operations Research
Minor System Analysis – GPA: 87.5%

- Thesis Topic: *A New Approach to Distribution Fitting: Decision on Beliefs*

TRAINING AND CERTIFICATES

School of Computer Science, Carnegie Mellon University                   November 2021

Machine Learning: Fundamentals and Algorithms

- 10–week online course

Overall Grade: 100%

September 2020

Deep Learning Specialization – 5-month online program including five courses:

- Neural Networks and Deep Learning
- Improving Deep Neural Networks
- Structuring Machine Learning Projects
- Convolutional Neural Networks
- Sequence Models

Overall Grade: 100%

Honors and
Awards

1. *Staff Excellence Award–Values Award Category*, University of Newcastle, 2020.

2. *Australian Society for Operations Research Rising Star Award*, Australia, 2017.

3. *Teaching Excellence and Contribution to Student Learning Team Award – Runner-up*, University of Newcastle, 2016.

4. *South Australia Science Excellence Award in the Category of PhD Research Excellence– Physical Sciences, Mathematics and Engineering – Runner-up*, Government of South Australia, Australia, 2011.

5. *B.H. Neumann Prize for the Best Student Talk – Runner-up*, The $54^{th}$ Annual Australian Mathematical Society Conference, Australia, 2010.

6. *Endeavour International Postgraduate Research Scholarship Award* (Covering Tuition Fees, Family Insurance and a Tax-Free Living Allowance of AU$27,222 per annum Over the Course of PhD Study), The Australian Government, Australia, 2008-2011.

7. *Best Paper Award*, The $5^{th}$ International Industrial Engineering Conference, Iran, 2005.

8. *Best Bachelor Final Project Award*, Awarded by the R&D Department of Schlumberger Company (US$1,000), France, 2002.

9. *Ranked First* (out of Approximately 5000 Entrants) in the Highly Competitive National Masters Entrance Exam of Iranian Universities, 2001.

10. *Best Student Award*, Sharif University of Technology, Iran, 2001.

Research
Grants:
AU$2,752,088
(equivalent to
US$1,987,407)
Total Awarded
Funds

1. Lead-Chief Investigator, Large Markov Decision Processes and Combinatorial Optimization, *Australian Research Council (ARC) Discovery Project*, AU$383,000, 2022–2024.

2. Lead-Chief Investigator, Stochastic Analysis of the COVID-19 Population, *ARC Centre of Excellence for Mathematical and Statistical Frontiers (ACEMS)*, AU$6,890, 2020–2022.

3. Chief Investigator, Big Time Series Data and Randomized Numerical Linear Algebra, *ACEMS*, AU$11,580, 2020.

4. Chief Investigator, Approximate Solutions to Large Markov Decision Processes, *ACEMS*, AU$12,000, 2019.

5. Chief Investigator, The Higher Education Participation and Partnerships Grant, *Australian Government, Department of Education and Training*, AU$161,151, 2016.

6. Chief Investigator, The Industrial Transformation Training Centre for Food and Beverage Supply Chain Optimization, *ARC Industrial Transformation Training Centre*, AU$2,119,872, 2016-2020.

7. Lead-Chief Investigator, Rapidly Mixing Markov Chains and the Hamiltonian Cycle Problem, *The Priority Research Centre for Computer-Assisted Research Mathematics and its Applications (CARMA)*, AU$30,000, 2014-2016.

8. Lead-Chief Investigator, The New Staff Grant, *University of Newcastle*, AU$10,000, 2014.

9. Chief Investigator, Application of Simulation-Based Optimization Algorithms in Sustainable Logistic and Supply Chain Management, *School of Management*, University of South Australia, AU$10,000, 2011.

10. Chief Investigator, Application of Non-Smooth Optimization Methods for Hamiltonian Cycle Problem, *Barbara Hardy Institute*, University of South Australia, AU$3,500, 2010.

11. Lead-Chief Investigator, An International Travel Grant, *University of South Australia*, Australia, AU$4,095, 2009.

PUBLICATIONS

1. **A. Eshragh**, O.D. Pietro and M. Saunders, Toeplitz Least Squares Problems, Fast Algorithms and Big Data, *Technical Report*, (arXiv preprint arXiv:2112.12994).

2. **A. Eshragh**, G. Livingston, T.M. McCann and L. Yerbury, Rollage: Efficient Rolling Average Algorithm to Estimate ARMA Models for Big Time Series Data, *Technical Report*, Under Review (arXiv preprint arXiv:2103.09175).

3. S. Alizamir, K. Bandara, **A. Eshragh**, and F. Iravani, An Interpretable Machine Learning Approach to Predicting Customer Behavior on JD.Com, *Technical Report*, Under Review (Available at SSRN).

4. V. Dewanto, G. Dunn, **A. Eshragh**, M. Gallagher and F. Roosta, Average-reward Model-free Reinforcement Learning: A Systematic Review and Literature Mapping, *Technical Report*, (arXiv preprint arXiv:2010.08920).

5. A.S. Altamiranda, H. Charkhgard, I. Dayarianb, **A. Eshragh** and S. Javadia, Learning to Project in Multi-objective Binary Linear Programming, *Technical Report*, Under Review (arXiv preprint arXiv:1901.10868).

6. **A. Eshragh**, F. Roosta, A. Nazari and M. Mahoney, LSAR: Efficient Leverage Score Sampling Algorithm for the Analysis of Big Time Series Data, *Journal of Machine Learning Research*, 23:1-36, 2022.

7. **A. Eshragh**, B. Ganim, T. Perkins and K. Bandara, The Importance of Environmental Factors in Forecasting Australian Power Demand, *Environmental Modeling & Assessment*, 27:1–11, 2022.

8. M. Abolghasemi, J. Hurley, **A. Eshragh** and B. Fahimnia, Demand Forecasting in the Presence of Systematic Events: Cases in Capturing Sales Promotions, *International Journal of Production Economics*, 230:107892, 2020.

9. **A. Eshragh**, S. Alizamir, P. Howley and E. Stojanovski, Modeling the Dynamics of the COVID-19 Population in Australia: A Probabilistic Analysis, *PLOS-One*, 15(10):e0240153, 2020.

10. **A. Eshragh**, R. Esmaeilbeigi and R. Middleton, An Analytical Bound on the Fleet Size in Vehicle Routing Problems: A Dynamic Programming Approach, *Operations Research Letters*, 48(3):350-355, 2020.

11. **A. Eshragh**, J. Filar, T. Kalinowski and S. Mohammadian, Hamiltonian Cycles and Subsets of Discounted Occupational Measures, *Mathematics of Operations Research*, 45(2):403-795, 2020.

12. H. Charkhgard and **A. Eshragh**, A New Approach to Select the Best Subset of Predictors in Linear Regression Modeling: Bi-Objective Mixed Integer Liner Programming, *ANZIAM Journal*, 62(1):64-75, 2019.

13. B. Fahimnia, H. Davarzani and **A. Eshragh**, Performance Comparison of Three Meta-Heuristic Algorithms for Planning of a Complex Supply Chain, *Computers and Operations Research*, 89:241-252, 2018.

14. R. Esmaeilbeigi, **A. Eshragh**, R. Garcia-Flores and M. Heydar, Whey Reverse Logistics Network Design: A Stochastic Hierarchical Facility Location Model, *Proceedings of the $22^{nd}$ International Congress on Modeling and Simulation*, Hobart, Australia, December 2017.

15. K. Avrachenkov, **A. Eshragh** and J. Filar, On Transition Matrices of Markov Chains Corresponding to Hamiltonian Cycles, *Annals of Operations Research*, 243(1):19-35, 2016.

16. N.G. Bean, **A. Eshragh** and J.V. Ross, Fisher Information for a Partially-Observable Simple Birth Process, *Communications in Statistics: Theory and Methods*, 45(24):7161-7183, 2016.

17. N.G. Bean, R. Elliott, **A. Eshragh** and J.V. Ross, On Binomial Observation of Continuous-Time Markovian Population Models, *Journal of Applied Probability*, 52:457-472, 2015.

18. B. Fahimnia, J. Sarkis, A. Choudhary and **A. Eshragh**, Tactical Supply Chain Planning Under a Carbon Tax Policy Scheme: A Case Study, *International Journal of Production Economics*, 164:206-215, 2015.

19. B. Fahimnia, J. Sarkis and **A. Eshragh**, A Trade-off Model for Green Supply Chain Planning: A Leanness-Versus-Greenness Analysis, *OMEGA*, 54:173-190, 2015.

20. **A. Eshragh**, Fisher Information, Stochastic Processes and Generating Functions, *Proceedings of the $21^{st}$ International Congress on Modeling and Simulation*, Gold Coast, Australia, December 2015.

21. **A. Eshragh** and J. Filar, Hamiltonian Cycles, Random Walks and the Geometry of the Space of Discounted Occupational Measures, *Mathematics of Operations Research*, 36(2):258-270, 2011.

22. **A. Eshragh**, J. Filar and M. Haythorpe, A Hybrid Simulation-Optimization Algorithm for the Hamiltonian Cycle Problem, *Annals of Operations Research*, 189:103–125, 2011.

23. K. Avrachenkov, **A. Eshragh** and J. Filar, Markov Chains and Hamiltonian Transition Matrices, *Proceedings of the $5^{th}$ International ICST Conference on Performance Evaluation Methodologies and Tools*, Paris, France, 2011.

24. **A. Eshragh**, J. Filar and A. Nazari, A Projection-Adapted Cross Entropy (PACE) Method for Transmission Network Planning, *Energy Systems*, 2(2):189-208, 2011.

25. **A. Eshragh** and M. Modarres, A New Approach to Distribution Fitting: Decision on Beliefs, *Journal of Industrial and Systems Engineering*, 3(1):56-71, 2009.

26. H. Mahlooji, **A. Eshragh**, H. Abouee Mehrizi and N. Izady, Uniform Fractional Part: A Simple Fast Method for Generating Continuous Random Variates, *Scientia Iranica*, 15(5):613-622, 2008.

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TALKS IN
INTERNATIONAL
CONFERENCES

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1. Efficient Leverage Score Sampling Algorithm for the Analysis of Big Time Series Data, *The 2021 INFORMS Annual Meeting*, Anaheim/Online, USA, 2021.

2. A New Fast Algorithm to Approximate the Leverage Scores of Big Time Series Data: Theory and Application, *The 20$^{th}$ INFORMS Applied Probability Society Conference*, Brisbane, Australia, 2019.

3. Optimal Experimental Design For a Partially Observable Simple Birth Process, *The 2018 INFORMS Annual Meeting*, Phoenix, USA, 2018.

4. A New Approach to Select the Best Subset of Predictors in Linear Regression Modeling, *The 61$^{st}$ Australian Mathematical Society Conference*, Sydney, Australia, 2017.

5. Fisher Information, Stochastic Processes and Generating Functions, *The 18$^{th}$ INFORMS Applied Probability Conference*, Istanbul, Turkey, 2015.

6. Fisher Information, Stochastic Processes and Generating Functions, *The 21$^{st}$ International Congress on Modeling and Simulation*, Gold Coast, Australia, 2015.

7. Approximating the Fisher Information for a Partially-Observable Growing Population, *ICERM Workshop on Challenges in 21$^{st}$ Century Experimental Mathematical Computation*, Providence, USA, 2014.

8. Random Walks, Polyhedra and Hamiltonian Cycles, *CARMA Workshop on Optimization, Nonlinear Analysis, Randomness & Risk*, Newcastle, Australia, 2014.

9. On Binomial Observations of Continuous-Time Markov Chains, *The 57$^{th}$ Australian Mathematical Society Conference*, Sydney, Australia, 2013.

10. Fisher Information for a Partially-Observable Simple Birth Process, *Australia and New Zealand Applied Probability Workshop*, Brisbane, Australia, 2013.

11. Optimal Observation Times for a Partially-Observable Pure Birth Process, *The 26$^{th}$ European Conference on Operational Research*, Rome, Italy, 2013.

12. Hamiltonian Cycles, Extreme Points and Rapidly Mixing Markov Chains, *Hamiltonian Cycle, Traveling Salesman and Related Optimization Problems Workshop*, Adelaide, Australia, 2012.

13. Optimal Experimental Design for a Pure Birth Process with Incomplete Information, *The 25$^{th}$ European Conference on Operational Research*, Vilnius, Lithuania, 2012.

14. A Modified Cross Entropy Method for the Optimization of an Environmentally Sustainable Supply Chain, *The 25$^{th}$ European Conference on Operational Research*, Vilnius, Lithuania, 2012.

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15. Optimal Observations of a Growing Population, *The 48$^{th}$ Australian and New Zealand Industrial and Applied Mathematics Conference*, Warrnambool, Australia, 2012.

16. Polynomial Limit Control Algorithm to Identify Nearly all Cubic, non-Hamiltonian, Graphs, *The 19$^{th}$ Triennial Conference of the IFORS*, Melbourne, Australia, 2011.

17. On Random Graphs, Random Walks and the Hamiltonian Cycle Problem, *The 54$^{th}$ Annual Australian Mathematical Society Conference*, Brisbane, Australia, 2010.

18. A Random Pivoting Algorithm for the Hamiltonian Cycle Problem, *The 24$^{th}$ European Conference on Operational Research*, Lisbon, Portugal, 2010.

19. Investigating Hamiltonian Cycles through Random Walks, *The 46$^{th}$ Australian and New Zealand Industrial and Applied Mathematics Conference*, Queenstown, New Zealand, 2010.

20. A New Random Algorithm for the Hamiltonian Cycle Problem, *The 23$^{rd}$ European Conference on Operational Research*, Bonn, Germany, 2009.

21. A Hybrid Simulation-Optimization Algorithm for the Hamiltonian Cycle Problem, *The 45$^{th}$ Australian and New Zealand Industrial and Applied Mathematics Conference*, Caloundra, Australia, 2009.

22. A New Approach to Response Surface Methodology, *The 5$^{th}$ International Industrial Engineering Conference*, Tehran, Iran, 2005.

23. A New Approach to Distribution Fitting: Decision on Beliefs, *The 53$^{rd}$ Session of International Statistical Institute*, Seoul, South Korea, 2001.

24. Order Statistics and Their Applications, *The 1$^{st}$ Iranian Statistical Student Conference*, Tehran, Iran, 1999.

INVITED SEMINARS

25. Efficient Models and Algorithms for the Analysis of Big Time Series Data, *International Computer Science Institute*, University of California at Berkeley, USA, April 13, 2022.

26. Randomized Numerical Linear Algebra and the Analysis of Big Time Series Data, *Simons Institute for the Theory of Computing*, University of California at Berkeley, USA, December 16, 2019.

27. Efficient Leverage Score Sampling for the Analysis of Big Time Series Data, *School of Mathematics and Statistics*, University of Melbourne, Australia, October 21, 2019.

28. Hamiltonian Cycles, Polytopes and Random Walks, *Colloquium–School of Mathematics and Physics*, University of Queensland, Australia, February 18, 2019.

29. Hamiltonian Cycles and Subsets of Discounted Occupational Measures, *Linear Algebra and Optimization Seminars–Institute for Computational & Mathematical Engineering*, Stanford University, USA, October 25, 2018.

30. Hamiltonian Cycles, Polytopes and Markov Chains, *Simons Institute for the Theory of Computing*, University of California at Berkeley, USA, February 19, 2016.

31. Fisher Information, Stochastic Processes and Generating Functions, P, *Colloquium–School of Mathematics and Statistics*, University of New south Wales, Australia, October 8, 2015.

32. Computational Complexity of the Fisher Information, *INRIA–Paris*, France, October 6, 2014.

33. Binomial Observations, Fisher Information and Optimal Sampling Times, *Colloquium–School of Mathematical and Physical Sciences*, University of Newcastle, Australia, November 14, 2013.

34. P or NP: That Is the Question, *Undergraduate Seminar–School of Mathematical Sciences*, University of Adelaide, Australia, May 22, 2012.

35. Can Hamiltonian Cycle Problem on a Random Graph be Solved with High Probability in a Polynomial Time?, *Colloquium–Faculty of Information Technology*, Monash University, Australia, February 29, 2012.

36. Hamiltonian Cycles and Random Walks, *Colloquium–School of Computer Science*, University of Adelaide, Australia, December 7, 2011.

37. Hybrid Simulation-Optimization Algorithm for Combinatorial Optimization Problems, *Divisional Research Day–University of South Australia*, Australia, September 10, 2010.

38. Hamiltonian Cycles, Random Walks and Discounted Occupational Measures, *Department of Applied Mathematics*, University of Twente, The Netherlands, June 22, 2010.

39. Decision on Beliefs: Concepts and Applications, *Indian Statistical Institute–New Delhi*, India, March 2004.

TEACHING
EXPERIENCE

**List of Courses:**

- Business Decision Making, Supply Chain Optimization, Forecasting with Linear Time Series Models, Deterministic and Stochastic Optimisation, Data Analytics for Business Intelligence, Markov Chains and Their Applications, Markov Decision Processes, Discrete Event Simulation, Engineering Statistics, and Statistical Reasoning and Literacy.

**Teaching Scores:**

- Achieving an average *Student Feedback on Teaching* (SFT) and *Student Feedback on Courses* (SFC) score of 4.7 and 4.9 (out of 5), respectively, across the past three years. The School and University average SFC scores are 4.1 and 4.0, respectively..

**Course Development:**

- Designing all Teaching/Assessment Materials for the Newly Established Course *Deterministic and Stochastic Optimization*, Third-year Core Course for Mathematics /Statistics/Engineering/Business Students, University of Newcastle, 2021.

- Designing all Teaching/Assessment Materials for the Newly Established Course *Engineering Statistics*, Second-year Core Course for Electronic and Electrical Engineering Students, University of Newcastle, 2018-2019.

- Designing all Teaching/Assessment Materials for the Course *Business Decision Making* in the Blended Mode, First-Year Core Course for Business Students, University of Newcastle, 2016-2017.

- Developing Course Syllabus as well as All Teaching/Assessment Materials for the Course *Forecasting with Linear Time Series Models*, Elective Third-year/Graduate Course for Mathematics/Statistics/Engineering/Business Students, University of Newcastle, 2016-2017.

- Developing All Teaching/Assessment Materials for the Course *Engineering Mathematics and Statistics*, Second-year Core Course for Electrical Engineering and Computer Science Students, University of Newcastle, 2014-2015.

- Developing All Teaching/Assessment Materials for the Course *Statistics in Engineering*, Compulsory Graduate Course for Engineering Students, University of Adelaide, 2013.

SUPERVISING EXPERIENCE

- PhD Student     2022-2025

  Thesis Title: *New Algorithms for Analysing Big Time Series Data: Nexus Between Classical Statistical Models and Modern Data Science Methods*

- Honours Student     2021-2022

  Thesis Title: *Solution Algorithms for Large Markov Decision Processes*

- Honours Student     2021

  Thesis Title: *Toeplitz Least Squares Problems, Fast Algorithms and Big Data*

- PhD Student     2020-2023

  Thesis Title: *Efficient Algorithms to Detect Outliers in Big Data*

- Honours Student     2020

  Thesis Title: *A New Algorithm for Fitting ARMA Models to Big Time Series Data*

- Honours Student     2020

  Thesis Title: *Rollage: Efficient Rolling Average Algorithm to Estimate ARMA Models for Big Time Series Data*

- MPhil Student (Part-time)     2019-2022

  Thesis Title: *Reinforcement Learning with a Weighted-sum Reward Function*

- Honours Student     2019

  Thesis Title: *A New State Aggregation Algorithm to Solve Large Markov Decision Processes*

- PhD Student     2018-2021

  Thesis Title: *Policy Optimization in Reinforcement Learning*

- Honours Student     2017-2018

  Thesis Title: *Exploration of Flu-tracking Approaches Using Time Series Models*

- Honours Student     2016-2017

  Thesis Title: *Optimal Observation Times, Fisher Information and Generating Functions*

POSITIONS AND PROFESSIONAL EXPERIENCES

- Associate Professor in Business Analytics and Operations Management 2022-Present

  Carey Business School, Johns Hopkins University, United States

- Senior Lecturer in Data Science – Honorary                    2022-Present

  School of Information and Physical Sciences, University of Newcastle, Australia

- Senior Lecturer in Data Science – Ongoing                      2018-2022
  (Equivalent to Tenured Associate Professor in the U.S. System)

  School of Information and Physical Sciences, University of Newcastle, Australia

- Lecturer in Statistics and Optimization – Ongoing             2014-2017

  School of Mathematical and Physical Sciences, University of Newcastle, Australia

- Lecturer in Stochastic Operations Research – Fixed Term        2013-2014

  School of Mathematical Sciences, University of Adelaide, Australia

- Postdoctoral Research Associate                                2011-2013
  *Working on the Australian Research Council (ARC) Discovery Project Entitled 'New Methods for Improving Active Adaptive Management in Biological Systems'*

  School of Mathematical Sciences, University of Adelaide, Australia

- Consultant

  Several Industries and Organizations Including Coca-Cola Amatil, Nestlé, and Sanitarium Health & Wellbeing Australia

PROFESSIONAL
SERVICES

- *Program Director*, Graduate Certificate in Data Analytics/Science, University of Newcastle.                                                          2021

- *Associate Editor and Member of Editorial Board*, Environmental Modeling & Assessment, Springer Journal.                                   2020-Present

- *Chair and Organizer*, Data Science Down Under International Workshop, Newcastle. 8-12 December, 2019

- *Deputy Head of School – Industry and Engagement Coordinator*, School of Information and Physical Sciences, University of Newcastle.               2019-2021

- *Academic Representative on the Organizing Committee*, Quarterly Central Coast and Hunter Area Supply Chain & Logistics Forum.               2019-2021

- *Member of the Faculty of Science Board*, University of Newcastle.      2019-2020

- *Chair and Organizer*, Applied Probability, Combinatorics and Optimization Workshop, Newcastle.                                                 17 December, 2016

- *Member of the Faculty of Science Board*, University of Newcastle.      2016-2017

- Member of *Progress and Appeals Committee*, Faculty of Science, University of Newcastle.                                                            2016-2021

- *Ph.D. Students Coordinator*, School of Mathematical and Physical Sciences, University of Newcastle.                                                        2014-2017

- *Organizer*, Hamiltonian Cycle and Traveling Salesman Problems: Theory and Computation Workshop, Adelaide.                          14-15 December, 2012

- *Convener*, Stochastic Lunch: Fortnightly Research Presentations Meetings, School of Mathematical Sciences, University of Adelaide.                    2012

- *Returning Officer*, Australian and New Zealand Industrial and Applied Mathematics (ANZIAM) Division. 2012-2014

- Refereeing for Journals: *Operations Research, Mathematics of Operations Research, European Journal of Operational Research, Annals of Operations Research, Journal of the American Statistical Association, Journal of Applied Probability, Random Structures and Algorithms, Queuing Systems, Computers and Operations Research, OMEGA, International Journal of Production Economics, International Journal of Production Research, ANZIAM Journal,* and *Naval Research Logistics.* 2009-Present

- Refereeing for Conferences: *International Conference on Machine Learning* (*ICML*), and *Annual Conference on Neural Information Processing Systems* (*NIPS*). 2018-Present

PROFESSIONAL AFFILIATIONS

- Institute for Operations Research and the Management Sciences (INFORMS)
- Australian Society for Operations Research (ASOR)

SPECIAL SKILLS

**Software Skills:**
- Mathematical Packages: *Matlab, Mathematica*
- Statistical Packages: *R, SPSS*
- Optimization Packages: *CPLEX, Lingo*
- Discrete-event Simulation Packages: *Arena, Enterprise Dynamics*
- Programming Languages: *C, Python*
- Others: *LATEX, MS-Office*

**Languages:**
- Persian (Native)
- English (Fluent)
- French (Elementary)