Mohammad Ali Javidian, Ph.D.

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Research Interests

- Probabilistic Graphical Models (Bayesian Networks, Chain Graphs, Markov Networks); Causality; Transfer Learning; Quantum Computing.

Education

2015 – 2019 — **Ph.D.** in Computer Science and Engineering, **University of South Carolina, USA**.
Thesis title: *Properties, Learning Algorithms, and Applications of Chain Graphs and Bayesian Hypergraphs.* Advisor: Marco Valtorta, Ph.D.

2011 – 2013 — **M.Sc.** in Computer Science, **Sharif University of Technology, Iran.**
Thesis title: *Disappointment in Social Choice Protocols*. Advisor: Rasoul Ramezanian, Ph.D.

2004 – 2007 — **M.Sc.** in Mathematics, **Shiraz University, Iran.**
Thesis title: *Invariant Subspaces for the Backward Shift on Hilbert Spaces of Analytic Functions with Regular Norm*. Advisor: Bahram Khani Robati, Ph.D.

1999 – 2003 — **B.Sc.** in Mathematics, **Shahid Bahonar University of Kerman, Iran.**

Academic Positions

Starting Aug 2022 — **Assistant Professor**, *Appalachian State University*, Boone, North Carolina, USA.
Assistant Professor in the Department of Computer Science in the College of Arts and Sciences beginning on August 15, 2022.

Sep 2020–July 2022 — **Postdoctoral researcher**, *Purdue University*, West Lafayette, IN, USA.
Working with Prof. Zubin Jacob and Prof. Vaneet Aggarwal on the development of novel algorithmic and theoretically principled methods for quantum entropic causal inference.

Sep 2019–July 2022 — **Research Assistant/Post-Doctoral Fellow**, *University of South Carolina*, Columbia, SC, USA.
Working with Dr. Pooyan Jamshidi on performance debugging of highly-configurable software systems, collaborating very closely with Prof. Marco Valtorta.

Jan 2019–Aug 2019 — **Research Assistant**, *University of South Carolina*, Columbia, SC, USA.
Working with Dr. Pooyan Jamshidi on causal structure learning and their applications in machine learning systems, collaborating very closely with Prof. Marco Valtorta.

Jan 2017–Dec 2018 — **Research Assistant**, *University of South Carolina*, Columbia, SC, USA.
Working with Prof. Marco Valtorta on probabilistic graphical models: interpretations, expressiveness and learning algorithms.

Mar 2012–Sep 2013 — **Research Assistant**, *Sharif University of Technology*, Tehran, Iran.
Working with Dr. Rasoul Ramezanian on social choice theory and voting protocols.

Feb 2006–Sep 2007 — **Research Assistant**, *University of Shiraz*, Shiraz, Iran.
Working with Dr. Bahram Khani Robati on functional analysis: Hilbert and Bergman spaces.

Research Publications

1. **Mohammad Ali Javidian**, Aggarwal, V., & Jacob, Z. (2022). Quantum causal inference in the presence of hidden common causes: An entropic approach. ***Phys. Rev. A***, *106*, 062425.
https://doi.org/10.1103/PhysRevA.106.062425

2. Iqbal, S., Krishna, R., **Mohammad Ali Javidian**, Ray, B., & Jamshidi, P. (2022). Reasoning about configurable system performance through the lens of causality [Proceedings of the **European Conference on Computer Systems (EuroSys)**, Rennes, France (Acceptance rate: 25.9 %)].

3. **Mohammad Ali Javidian**, Pandey, O., & Jamshidi, P. (2021). Scalable causal domain adaptation [**NeurIPS WHY-21 (Causal Inference & Machine Learning: Why now?)**, Online (**Selected as Contributed Talk**)].

4. **Mohammad Ali Javidian**, V. Aggarwal, & Jacob, Z. (2021a). Identification of latent graphs: A quantum entropic approach [**NeurIPS WHY-21 (Causal Inference & Machine Learning: Why now?)**, Online].

5. **Mohammad Ali Javidian**, V. Aggarwal, & Jacob, Z. (2021b). Quantum causal inference: An entropic approach [**8th Causal Inference Workshop at UAI (causalUAI2021)**, Online].

6. **Mohammad Ali Javidian**, V. Aggarwal, & Jacob, Z. (2021c). Tensor rings for learning circular hidden markov models [**NeurIPS 2021 Second Workshop on Quantum Tensor Networks in Machine Learning (QTMNL2021)**, Online].

7. **Mohammad Ali Javidian**, & Valtorta, M. (2021). A decomposition-based algorithm for learning the structure of multivariate regression chain graphs [Impact Factor: 3.816]. ***International Journal of Approximate Reasoning***, *136*, 66–85.

8. **Mohammad Ali Javidian**, Valtorta, M., & P. Jamshidi. (2021). An order-independent algorithm for learning chain graphs [Uncertain Reasoning Special Track (Full paper acceptance rate: 38 %)], In ***Proceedings of the 34th International FLAIRS Conference***. Uncertain Reasoning Special Track (Full paper acceptance rate: 38 %).

9. Rahman, M. M., Rasheed, A., Khan, M. M., **Mohammad Ali Javidian**, P. Jamshidi, & Mamun-Or-Rashid, M. (2021). Accelerating recursive partition-based causal structure learning using an improved structure refinement approach, In ***Proceedings of the 20th International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2021)*** *(Full paper acceptance rate: 24 %).*

10. **Mohammad Ali Javidian**, P. Jamshidi, & Valtorta, M. (2020). Learning LWF chain graphs: A Markov blanket discovery approach, In ***Proceedings of the 36th Conference on Uncertainty in Artificial Intelligence (UAI'20)*** *(Acceptance rate: 27.5 %).*

11. **Mohammad Ali Javidian**, Valtorta, M., & P. Jamshidi. (2020). AMP chain graphs: Minimal separators and structure learning algorithms. ***Journal of Artificial Intelligence Research (JAIR)*** *(Impact Factor: 2.44).*

12. **Mohammad Ali Javidian**, Wang, Z., Lu, L., & Valtorta, M. (2020). On a hypergraph probabilistic graphical model. ***Annals of Mathematics and Artificial Intelligence*** *(Five year impact factor: 1.126).*

13. Krishna, R., Iqbal, S., **Mohammad Ali Javidian**, Ray, B., & Jamshidi, P. (2020). CADET: A systematic method for debugging misconfigurations using counterfactual reasoning [**NeurIPS 2020 Workshop on Machine Learning for Systems (MLFS2020)**, Zoomville].

14. **Mohammad Ali Javidian**, Jamshidi, P., & Ramezanian, R. (2019). Avoiding social disappointment in elections, In ***Proceedings of the International Conference on Autonomous Agents and Multiagent Systems (AAMAS'19)*** *(Acceptance rate: 25 %).*

15. **Mohammad Ali Javidian**, P. Jamshidi, & Valtorta, M. (2019). Transfer learning for performance modeling of configurable systems: A causal analysis [**First AAAI Spring Symposium "Beyond Curve Fitting: Causation, Counterfactuals, and Imagination-based AI"**, Stanford, CA].

16. **Mohammad Ali Javidian**, Valtorta, M., & P. Jamshidi. (2019). Order-independent structure learning of multivariate regression chain graphs, In ***Proceedings of the International Conference on Scalable Uncertainty Management (SUM'19)*** *(Acceptance rate: 56.8 %).*

17. Wang, Z., **Mohammad Ali Javidian**, Lu, L., & Valtorta, M. (2019). The causal interpretations of Bayesian hypergraphs [**First AAAI Spring Symposium "Beyond Curve Fitting: Causation, Counterfactuals, and Imagination-based AI"**, Stanford, CA].

18. **Mohammad Ali Javidian**, & Valtorta, M. (2018a). On the properties of MVR chain graphs [**Workshop proceedings of the International Conference on Probabilistic Graphical Models (PGM'18)**, Prague].

19. **Mohammad Ali Javidian**, & Valtorta, M. (2018b). Finding minimal separators in ancestral graphs [**Causal Inference Workshop at the Uncertainty in Artificial Intelligence (UAI'18)**, Monterey, CA].

20. **Mohammad Ali Javidian**, & Valtorta, M. (2018c). Finding minimal separators in LWF chain graphs, In ***Proceedings of the International Conference on Probabilistic Graphical Models (PGM'18)*** *(Acceptance rate: 70 %).*

Grant Awards

February 2023
- **2023-2025 GRAM Award**, Award Amount: $28,000
  Project: Using Causal Models for Reasoning about the Performance of Modern Software Systems
- **2023 CAS Research/Proposal Development Summer Grant**, Award Amount: $5,000
  Project: Application of Causal Inference in the Performance of Highly Configurable Systems

November 2022
- **2023 Summer Stipend for Writing A Grant (SWAG) Program**, Award Amount: $3,500
  Project: Gamified Approach to Vaccination Encouragement through the Lens of Causality

Talks

Nov 2021
- "Quantum Entropic Causal Inference." Presented in Quantum Information Measurement (QIM) Topical Meeting (virtual).

Sep 2020
- "Causal Structure Learning for Domain Adaptation." Presented in Junior Honors seminar at Claflin University (Invited by: Dr. Deidra J Morrison Wells).

Teaching Experience

Spring 2023
- **Instructor**, *Appalachian State University*, Boone, NC, USA.
  CS 5549, Causal Inference in CS
  CS 1100, Discrete Mathematics (2 sections)

Fall 2022
- **Instructor**, *Appalachian State University*, Boone, NC, USA.
  CS 1100, Discrete Mathematics (2 sections)
  CS 4800, Capstone Project

Fall 2016
- **Teaching Assistant**, *University of South Carolina*, Columbia, SC, USA.
  CSCE 330, Programming Language Structures
  CSCE 355, Foundations of Computation

Summer 2016
- **Instructor**, *University of South Carolina*, Columbia, SC, USA.
  CSCE 101, Introduction to Computer Concepts

Fall 2015–Spring 2016
- **Teaching Assistant (Lab TA)**, *University of South Carolina*, Columbia, SC, USA.
  CSCE 145–6, Algorithmic Design I,II

Spring 2014
- **Instructor**, *Sharif University of Technology*, Tehran, Iran.
  Math 141–2, Calculus I,II

2007–2011
- **Instructor**, *Azad University of Shiraz (SAMA)/Neyriz/Sepidan*, Fars, Iran.
  Discrete Mathematics, Calculus I,II, Numerical Analysis

2003–2004
- **Teacher**, *High Schools in Darab*, Fars, Iran.
  Discrete Mathematics, Calculus, Statistics, Linear Algebra

Mentoring Experience

Fall 2022-Now
- *Appalachian State University*, Boone, NC, USA.
  Project: Causal structure learning and their applications in ML & AI.
  Mentee: Alex Cozzie (graduate student, Spring 2023-Now)
  Mentee: Jeremy Roberts (graduate student, Spring 2023-Now)
  Mentee: Vidhi Patel (graduate student, Fall 2022)
  Mentee: Jordan Greene (graduate student, Fall 2022)

Spring 2020-Spring 2022
- **AISys Lab**, *University of South Carolina*, Columbia, SC, USA.
  Project: Performance Debugging of Software Systems.
  Mentee: Md Shahriar Iqbal (graduate student)

Summer 2020-Now
- **AISys Lab**, *University of South Carolina*, Columbia, SC, USA.
  Project: Causal Transfer Learning in Software Systems and Health Care.
  Mentee: Om Pandey (undergraduate student, started: Summer 2020)
  Mentee: Ahana Biswas (undergraduate student, started: April 2021)
  Mentee: Morteza Maleki (graduate student, started October 2021)
  Mentee: Cody Shearer (undergraduate student, Summer 2020-March 2021)

Mentoring Experience (continued)

Summer 2019 — **AISys Lab**, *University of South Carolina*, Columbia, SC, USA.
Project: Bayesian Structure Learning (McNAIR Junior Fellows)
Mentee: Tristan Klintworth (undergraduate student)

Professional Service

- **Director of Data Science Certificate Program**, Department of Computer Science, Appalachian State University - (Fall 2022 - now).
- **Program Committee member**, UAI 2022, Eindhoven, Netherlands - UAI 2021, Online.
- **Program Committee member**, PGM 2022, Almeria - PGM 2020, Aalborg - PGM 2018, Prague.
- **Program Committee member**, FLAIRS-35, Florida, USA.
- **Program Committee member**, ITCI 2022.
- **Reviewer (Conferences)**, AISTATS 2022, Valencia, Spain - AISTATS 2021, Virtual - UAI 2020, Toronto - SEAMS 2020, Seoul - SEAMS 2019, Montreal - UAI 2018, California - UAI 2017, Sydney.
- **Reviewer (Journals)**, Scandinavian Journal of Statistics, 1 paper- International Journal of Approximate Reasoning (IJAR), 1 paper- PLOS One, 1 paper.

Skills

Languages	Strong reading, writing and speaking competencies for English and Persian (Farsi).
Coding	R, Python, Matlab, Java.
Databases	MySQL.
Web Dev	HTML, CSS, JavaScript.
Misc.	LaTeX