MARK NEJAD

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Google Scholar Page

ACADEMIC POSITIONS

University of Delaware   *1/2017 - Present*
Assistant Professor, Department of Civil & Environmental Engineering

University of Oklahoma   *8/2015 - 12/2016*
Assistant Professor, School of Industrial & Systems Engineering

EDUCATION

- Ph.D., Industrial Engineering, Wayne State University, 8/2015

- M.Sc., Computer Science, Wayne State University, 5/2014

- M.Sc., Systems Engineering, University of Science and Technology, 8/2008

- B.Sc., Mathematics, Iran University of Science and Technology, 6/2005

PUBLICATION AWARDS

- 2019 Best Paper Award of the IEEE Connected and Automated Vehicles Symposium from the IEEE Vehicular Technology Society

- 2017 Best Application Paper Honorable Mention (2nd place) of IISE Transactions Scheduling & Logistics (issues 47:7 through 48:6)

- 2016 Best Ph.D. Dissertation Award: 1st place of the 2016 Institute of Industrial and Systems Engineers (IISE) Pritsker Doctoral Dissertation Award

- 2015 IBM Research Service Science Best Student Paper Award-Finalist

- 2014 INFORMS ENRE Best Student Paper Award

    - INFORMS: Institute for Operations Research and the Management Sciences

    - ENRE: Energy, Natural Resources, and the Environment Section

- 2014 INFORMS Service Science Best Paper Runner Up Award

- 2014 POMS College of Sustainable Operations Best Student Paper Runner Up Award

    - POMS: Production and Operations Management Society

PUBLICATIONS (citations: 1216, h-index: 18)

Student co-authors are marked with • when I am the primary advisor and ∗ when working with a colleague

A. Under-review Journal Papers

UJ1. B^2FL: A Bi-level Blockchained Architecture for Federated Learning-based Traffic Prediction
H. Guo∗, C. Meese•, W. Li•, H. Chen∗, C. Shen, and M. Nejad

UJ2. Blockchain-enabled Bidirectional and Privacy-preserving Authentication for Safe Ridesharing
W. Li•, C. Meese•, H. Guo∗, and M. Nejad

UJ3. An Equilibrium Analysis in Mixed Traffic Environments with Shared and Private Autonomous Vehicles
M. Shaygan•, F. Banani*, W. Liu, and M. Nejad

UJ4. BlockFed: Blockchain-enabled Federated Learning for Real-time Traffic Flow Prediction
C. Meese•, H. Chen*, W. Li•, S. Asif*, C. Shen, and M. Nejad

UJ5. ZK-BFT: A Zero-knowledge Byzantine Fault Tolerance Consensus for Permissioned Blockchain Networks
W. Li•, C. Meese•, H. Guo* , and M. Nejad

UJ6. Aggregated Zero-knowledge Proof for Blockchain-Empowered Autonomous Truck Platooning Authentication
W. Li•, C. Meese•, H. Guo*, and M. Nejad

B. Peer-reviewed Journal Papers

J1. A Blockchain-Edge Architecture for EHR Management with Attribute-based Signature Aggregation and Encryption
H. Guo*, W. Li•, M. Nejad, and C. Shen
IEEE Transactions on Network and Service Management, accepted, 2022.
▷ Impact Factor: 4.19

J2. Traffic Prediction using Artificial Intelligence: Review of Recent Advances and Emerging Opportunities
M. Shaygan•, C. Meese•, W. Li•, and M. Nejad
Transportation Research Part C: Emerging Technologies, accepted, 2021.
▷ Impact Factor: 8.09

J3. A Hierarchical and Location-aware Consensus Protocol for IoT-Blockchain Applications
H. Guo*, W. Li•, and M. Nejad
IEEE Transactions on Network and Service Management, accepted, 2021.
▷ Impact Factor: 4.19

J4. Privacy-Preserving Traffic Control: A Blockchain and Zero Knowledge Proof Inspired Approach
W. Li•, H. Guo*, M. Nejad, and C. Shen
IEEE Access, Vol. 8, pp. 181733-181743, 2020.
▷ Impact Factor: 3.7   ▷ Total Citations: 22
DOI: 10.1109/ACCESS.2020.3028189

J5. Autonomous and Semi-Autonomous Intersection Management: A Survey
G. Zhang, M. Nejad, and R. Lee
IEEE Intelligent Transportation Systems Magazine, Vol. 13, No. 2, pp. 53-70, 2020.
▷ Impact Factor: 3.3   ▷ Total Citations: 5
DOI: 10.1109/MITS.2020.3014074

J6. Proof-of-Event Recording System for Autonomous Vehicles: A Blockchain-based Solution
H. Guo*, W. Li•, M. Nejad, and C. Shen
IEEE Access, Vol. 8, pp. 182776-182786, 2020.
▷ Impact Factor: 3.7   ▷ Total Citations: 14
DOI: 10.1109/ACCESS.2020.3029512

J7. A Trust-Aware Mechanism for Cloud Federation Formation

L. Mashayekhy, M. Nejad, and D. Grosu

IEEE Transactions on Cloud Computing, Vol. 9, No. 4, pp. 1278-1292, 2021.

▷ Impact Factor: 5.93   ▷ Total Citations: 24

DOI: 10.1109/TCC.2019.2911831

J8. Influence of Connected and Autonomous Vehicle Clustering Strategies on Mixed Traffic Flow Characteristics: An Analysis of Vehicle Trajectory Data

G. Zhang, M. Nejad, R. Lee, and J. Lee

Transportation Research Part C: Emerging Technologies, Vol. 115, pp.1-18, 2020.

▷ Impact Factor: 8.09   ▷ Total Citations: 21

DOI: 10.1016/j.trc.2020.102611

J9. Optimal Routing for Plug-in Hybrid Electric Vehicles *

M. Nejad, L. Mashayekhy, D. Grosu, and Ratna Chinnam

Transportation Science, Vol. 51, No. 4, pp. 1304-1325, 2017.

     * Earlier version received the Best Student Paper Award from INFORMS Energy, Natural Resources, and the Environment Section (ENRE)

     * Earlier version received the Best Student Paper Runner-Up Award from POMS College of Sustainable Operations

▷ Impact Factor (2017): 3.338   ▷ Total Citations: 25

DOI: 10.1287/trsc.2016.0706

J10. Online Scheduling and Pricing for Electric Vehicle Charging *

M. Nejad, L. Mashayekhy, R. Chinnam, and D. Grosu

IISE Transactions, Focused Issue on Scheduling and Logistics, Vol. 49, No. 2, pp. 178-193, 2017.

▷ Impact Factor: 2.681   ▷ Total Citations: 20

DOI: 10.1080/0740817X.2016.1213467

     * Earlier version was a Finalist for the IBM Research Best Student Paper Award Competition, INFORMS Service Science

J11. Hierarchical Time-Dependent Shortest Path for Routing under Intelligent Transportation Systems *

M. Nejad, L. Mashayekhy, R. Chinnam, and Anthony Phillips

IISE Transactions, Focused Issue on Scheduling and Logistics, Vol. 48, No. 2, pp. 158-169, 2016.

▷ Impact Factor: 2.681   ▷ Total Citations: 18

DOI: 10.1080/0740817X.2015.1078523

     * Best Application Paper Honorable Mention, 2017 (2nd place among all journal papers published from July 2015 through June 2016, issues 47:7 through 48:6)

     * Featured Article of the IISE Industrial Engineer Magazine, January 2016 Issue

J12. An Online Mechanism for Resource Allocation and Pricing in Clouds

L. Mashayekhy, M. Nejad, D. Grosu, and Athanasios Vasilakos

IEEE Transactions on Computers, Vol. 65, No. 4, pp. 1172-1184, 2016.

▷ Impact Factor (2016): 2.916   ▷ Total Citations: 121

DOI: 10.1109/TC.2015.2444843

J13. Energy-Aware Scheduling of MapReduce Jobs for Big Data Applications

L. Mashayekhy, M. Nejad, D. Grosu, Quan Zhang, and Weisong Shi

IEEE Transactions on Parallel and Distributed Systems, Vol. 26, No. 10, pp. 2720-2733, 2015.

⊳ Impact Factor (2015): 2.661   ⊳ Total Citations: 148

J14. A PTAS Mechanism for Provisioning and Allocation of Heterogeneous Cloud Resources
L. Mashayekhy, M. Nejad, and D. Grosu
IEEE Transactions on Parallel and Distributed Systems, Vol. 26, No. 9, pp. 2386-2399, 2015.
⊳ Impact Factor (2015): 2.661   ⊳ Total Citations: 81

J15. Physical Machine Resource Management in Clouds: A Mechanism Design Approach
L. Mashayekhy, M. Nejad, and D. Grosu
IEEE Transactions on Cloud Computing, Special Issue on Economics and Market Mechanisms for Cloud Computing, Vol. 3, No. 3, pp. 247-260, 2015.
⊳ Impact Factor: 5.93   ⊳ Total Citations: 47

J16. Cloud Federations in the Sky: Formation Game and Mechanism
L. Mashayekhy, M. Nejad, and D. Grosu
IEEE Transactions on Cloud Computing, Vol. 3, No. 1, pp. 14-27, 2015.
⊳ Impact Factor: 5.93   ⊳ Total Citations: 162

J17. Truthful Greedy Mechanisms for Dynamic Virtual Machine Provisioning and Allocation in Clouds *
M. Nejad, L. Mashayekhy, and D. Grosu
IEEE Transactions on Parallel and Distributed Systems, Vol. 26, No. 2, pp. 594-603, 2015.
⊳ Impact Factor (2015): 2.661   ⊳ Total Citations: 195

    * Best Paper Runner-Up Award - INFORMS Service Science

    * Featured Article in the April-June 2015 Issue of Cloud-Link (presented by the IEEE Cloud Computing Initiative)

J18. Designing Customer-Oriented Catalogs in e-CRM using an Effective Self-adaptive Genetic Algorithm
I. Mahdavi, M. Nejad, F. Adbesh
Expert Systems with Applications, Vol. 38, No. 1, Elsevier, 2011.
⊳ Impact Factor: 3.93   ⊳ Total Citations: 35

D. Peer-reviewed Conference Proceedings

C1. BFRT: Blockchained Federated Learning for Real-time Traffic Flow Prediction
C. Meese•, H. Chen*, W. Li•, S. Asif*, C. Shen, M. Nejad
Proceedings of the 22nd IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGrid 2022), Sicily, Italy, May 2022.

C2. A Location-based and Hierarchical Framework for Fast Consensus in Blockchain Networks
H. Guo*, W. Li•, M. Nejad
Proceedings of the IEEE International Conference on Hot Information-Centric Networking (IEEE HotICN 2021), Nanjing, China, November 2021.

C3. P-CFT: A Privacy-preserving and Crash Fault Tolerant Consensus Algorithm for Permissioned Blockchains
W. Li•, C. Meese•, M. Nejad, H. Guo*
Proceedings of the IEEE International Conference on Hot Information-Centric Networking (IEEE HotICN 2021),
Nanjing, China, November 2021.
DOI:

C4. Location-aware Verification for Autonomous Truck Platooning Based on Blockchain and Zero-knowledge Proof
W. Li•, C. Meese•, H. Guo*, Z. Zhong, M. Nejad
Proceedings of the IIEEE International Conference on Blockchain and Cryptocurrency (IEEE ICBC 2021), Sydney
Australia, May 2021. (Acceptance rate: 19%)
DOI: ▷ Total Citations: 2

C5. Secure Connected Vehicle-Based Traffic Signal Systems Against Data Spoofing Attacks
T. Ma*, R. Zhang, M. Nejad
Proceedings of the IEEE Wireless Communications and Networking Conference (IEEE WCNC 2021), Nanjing,
China, March 2021.
DOI:

C6. Blockchain-enabled Identity Verification for Safe Ridesharing Levereging Zero-knowledge Proof
W. Li•, C. Meese•, H. Guo*, M. Nejad
Proceedings of the IEEE International Conference on Hot Information-Centric Networking (IEEE HotICN 2020),
Hefei, China, December 2020.
DOI: ▷ Total Citations: 7

C7. Attribute-based Multi-Signature and Encryption for EHR Management: A Blockchain-based Solution
H. Guo*, W. Li•, M. Nejad, C. Shen
Proceedings of the IIEEE International Conference on Blockchain and Cryptocurrency (IEEE ICBC 2020), Toronto,
Canada, May 2020. (Acceptance rate: 21%)
DOI: ▷ Total Citations: 20

C8. Access Control for Electronic Records with Hybrid Blockchain-Edge Architecture
H. Guo*, W. Li•, M. Nejad, C. Shen
Proceedings of the IEEE International Conference on Blockchain (IEEE Blockchain 2019), Atlanta, USA, July
2019. (Acceptance rate: 15%)
DOI: ▷ Total Citations: 66

C9. A Blockchain-Based Architecture for Traffic Signal Control Systems
W. Li•, M. Nejad, R. Zhang
Proceedings of the IEEE International Congress on Internet of Things (IEEE ICIOT 2019), Milan, Italy, July 2019.
(Acceptance rate: 26.2%)
DOI: ▷ Total Citations: 17

C10. Clustering Strategies of Cooperative Adaptive Cruise Control: Impacts on Human-driven Vehicles**
Z. Zhong, M. Nejad, E. Lee
Proceedings of the IEEE Connected and Automated Vehicles Symposium (IEEE CAVS 2019), Honolulu, USA,
September 2019.

* Best Paper Award of the IEEE CAVS 2019 from the IEEE Vehicular Technology Society.

DOI: ▷ Total Citations: 1

C11. Energy-aware Scheduling of MapReduce Jobs
L. Mashayekhy, M. Nejad, D. Grosu, Dajun Lu, and Weisong Shi

Proc. of the 3rd IEEE International Congress on Big Data (BigData'14)-Research Track, pp. 32-39, Anchorage, USA, June 2014. (Acceptance rate: 19%, highly competitive and prestigious)
DOI: [10.1109/BigData.Congress.2014.15](#) ▷ Total Citations: 43

C12. Incentive-Compatible Online Mechanisms for Resource Provisioning and Allocation in Clouds
L. Mashayekhy, M. Nejad, D. Grosu, and A. Vasilakos
Proc. of the 7th IEEE International Conference on Cloud Computing (CLOUD'14)-Research Track, pp. 312-319, Anchorage, USA, June 2014. (Acceptance rate: 18%, highly competitive and prestigious)
DOI: [10.1109/CLOUD.2014.50](#) ▷ Total Citations: 38

C13. A Framework for Data Protection in Cloud Federations
L. Mashayekhy, M. Nejad, and D. Grosu
Proc. of the 43rd International Conference on Parallel Processing (ICPP'14), pp. 283-290, Minneapolis, USA, September 2014. (Acceptance rate: 28%, most prestigious in my field)
DOI: [10.1109/ICPP.2014.37](#) ▷ Total Citations: 10

C14. A Two-Sided Market Mechanism for Trading Big Data Computing Commodities
L. Mashayekhy, M. Nejad, and D. Grosu
Proc. of the IEEE International Conference on Big Data (IEEE BigData 2014), pp. 153-158, Washington DC, USA, October 2014. (Short Paper, (49 full papers+57 short papers / 264), prestigious)
DOI: [10.1109/BigData.2014.7004225](#) ▷ Total Citations: 24

C15. A Truthful Approximation Mechanism for Autonomic Virtual Machine Provisioning and Allocation in Clouds
L. Mashayekhy, M. Nejad, and D. Grosu
Proc. of the ACM Cloud and Autonomic Computing Conference (CAC'13), pp. 1-10, Miami, USA, August 2013. (Acceptance rate: 35%, competitive)
DOI: [10.1145/2494621.2494637](#) ▷ Total Citations: 22

C16. A Family of Greedy Mechanisms for Dynamic Virtual Machine Provisioning and Allocation in Clouds
M. Nejad, L. Mashayekhy, and D. Grosu
Proc. of the 6th IEEE International Conference on Cloud Computing (CLOUD'13)-Research Track, pp. 188-195, Santa Clara, USA, July 2013. (Acceptance rate: 18%, highly competitive and prestigious)
DOI: [10.1109/CLOUD.2013.14](#) ▷ Total Citations: 58

C17. Effects of Traffic Network Dynamics on Hierarchical Community-based Representations of Large Road Networks
M. Nejad, L. Mashayekhy, and R. Chinnam
Proc. of the 15th IEEE International Conference on Intelligent Transportation Systems (ITSC'12), pp. 1900-1905, Anchorage, USA, September 2012. (competitive)
DOI: [10.1109/ITSC.2012.6338845](#) ▷ Total Citations: 9

C18. State Space Reduction in Modeling Traffic Network Dynamics for Dynamic Routing under ITS
M. Nejad, L. Mashayekhy, A. Taghavi, and R. Chinnam
Proc. of the 14th IEEE International Conference on Intelligent Transportation Systems (ITSC'11), pp. 277-282, Washington DC, USA, October 2011. (competitive)
DOI: [10.1109/ITSC.2011.6082984](#) ▷ Total Citations: 8

RESEARCH FUNDING

A. Awarded

1. **REU Site: Sustainable and Resilient Transportation Systems**
National Science Foundation
PI: Jovan Tatar, Co-PI: Mark Nejad

9/2021 to 8/2024
$420,383

2. **Artificial Intelligence Enhanced Integrated Transportation Management System (AI-ITMS) Deployment Program**
Federal Highway Administration, Advanced Transportation and Congestion Management Technologies Deployment Program (ATCMTD)
PIs: Mark Nejad with George Zhao (Intelligent Automation Inc. (acquired by BlueHalo)), Jennifer Duval (Jacobs Engineering Group Inc.)
09/2020 to 08/2023
$4,996,949

3. **Center for Energy-Efficient Sociotechnical Systems (CEESS)**
Delaware Energy Institute
PI: Andreas Malikopoulos, Co-PIs: Mark Nejad, Philip Barnes, Timothy Vickery, Lena Mashayekhy
2/2019-1/2021
$208,171

4. **USDOT SBIR Phase I :An Artificial Intelligence (AI) Traffic Data Analysis Tool for Advanced Freeway Traffic Management**
Department of Transportation
PI: George Zhao Intelligent Automation Inc (acquired by BlueHalo), UD PI: Mark Nejad
$150,000

TEACHING

- CIEG 315: Probability and Statistics for Engineers, Department of Civil and Environmental Engineering, University of Delaware, Spring 2022.

- CIEG 646: Convex Optimization, Department of Civil and Environmental Engineering, University of Delaware, Fall 2021.

- CIEG 865: Civil Engineering Seminar, Department of Civil and Environmental Engineering, University of Delaware, Fall 2021.

  - UD Course evaluation (6 participants): Q1: 4.33, Q2: 4.33, Q3: 4.33, Q4: 4.33, Q461: 4.33

- CIEG 646: Convex Optimization, Department of Civil and Environmental Engineering, University of Delaware, Fall 2020.

  - UD Course evaluation (6 participants): Q1: 4.17, Q2: 4.5, Q3: 4, Q4: 3.83, Q461: 3.5

- CIEG 865-14: Civil Engineering Seminar, Department of Civil and Environmental Engineering, University of Delaware, Fall 2020.

  - UD Course evaluation (6 participants): Q1: 4.5, Q2: 4.5, Q3: 4.17, Q4: 4.5, Q461: 3.5

- CIEG 865-13: Civil Engineering Seminar, Department of Civil and Environmental Engineering, University of Delaware, Fall 2020.

  - UD Course evaluation (7 participants): Q1: 4.14, Q2: 4.14, Q3: 4, Q4: 3.86, Q461: 3.57

- CIEG 646: Convex Optimization, Department of Civil and Environmental Engineering, University of Delaware, Fall 2019.

  - UD Course evaluation (5 participants): Q1: 4, Q2: 4.8, Q3: 3.8, Q4: 4.6, Q461: 4.2

- CIEG 315: Probability and Statistics for Engineers, Department of Civil and Environmental Engineering, University of Delaware, Spring 2019.

- UD Course evaluation (84 participants): Q1: 2.72, Q2: 3.42, Q3: 1.90, Q4: 2.15, Q461: 1.81

- CIEG 646: Convex Optimization, Department of Civil and Environmental Engineering, University of Delaware, Fall 2018.

    - UD Course evaluation (11 participants): Q1: 4.27, Q2: 4.73, Q3: 4.27, Q4: 4.55, Q461: 4.00

- CIEG 647: Network Optimization, Department of Civil and Environmental Engineering, University of Delaware, Spring 2018.

    - UD Course evaluation (9 participants): Q1: 3.89, Q2: 4.78, Q3: 4.00, Q4: 4.22, Q461: 4.00

- CIEG 667: Applied Operations Research, Department of Civil and Environmental Engineering, University of Delaware, Fall 2017.

    - UD Course evaluation (4 participants): Q1: 4.00, Q2: 5.00, Q3: 4.75, Q4: 4.25 , Q461: 4.00

- JANUX Online Course Instructor
  Development of a 16-week high-production online course "Optimization for Analytics" in JANUX, University of Oklahoma, Fall 2016.

- ISE 5970: Optimization for Analytics, School of Industrial and Systems Engineering, University of Oklahoma, Spring 2016.

- Tutorial Instructor (WSU)
  Automotive Operations Research (IE 7570), for Professional Engineering Management Master's Program (EMMP), Ford Motor Company, Summer 2011, Summer 2013, and Summer 2015.

- Teaching Assistant (WSU)

    - Supply Chain Management(IE 7315), Fall 2012 and Fall 2014.

    - IE 6560: Deterministic Optimization

    - Agile Systems for the Manufacturing Enterprise (IE7410), for Professional Engineering Management Master's Program (EMMP), Ford Motor Company, Fall 2013.

    - Launch through Sustainability: Products and Services (IE8943), Global Executive Track-Ph.D. in Industrial Engineering, Winter 2013 and Fall 2013.

    - Project Management (IE 6840), Winter 2011 and Winter 2012.

    - Lean Operations and Manufacturing (IE 6310), Summer 2014.

STUDENTS

Ph.D. Committee Chair

- Wanxin Li, CEE

    - Fall 2018-present, expected graduation: Spring 2022

    - Dissertation title: Frontiers in Blockchain for Secure Information Sharing in Next Generation Transportation Systems

- Maryam Shaygan, CEE

    - Fall 2018-present, expected graduation: Fall 2022

    - Dissertation title: Equilibrium Analysis in Mixed Traffic Environments

- Collin Meese, CEE

    - Summer 2020-present

Ph.D. Committee Member

- Prosper Kosi Anyidoho, CEE, University of Delaware, Advisor: Prof. Rachel Davidson

- Farid Qamar, Engineering and Public Policy, University of Delaware, Advisor: Prof. Gregory Dobler

- Tianye Ma, CIS, University of Delaware, Advisor: Prof. Rui Zhang

- Sina Naeimi Dafchahi, CEE, University of Delaware, Advisor: Prof. Rachel Davidson

- Nafiseh Soleimani, CEE, University of Delaware, Advisor: Prof. Rachel Davidson

- Dian Yuan, CEE, University of Delaware, Advisor: Prof. Arde Faghri

- Di Ha, CEE, University of Delaware, Advisor: Prof. Rachel Davidson

- Hao Gue, CIS, University of Delaware, Advisor: Prof. Chien-Chung Shen

- Kun Yang, CEE, University of Delaware, Advisor: Prof. Rachel Davidson

- Dong Wang, CEE, University of Delaware, Advisor: Prof. Rachel Davidson

Undergraduate Research Assistants

- Collin Meese, Fall 2019, Winter 2020, and Spring 2020

SERVICE TO PROFESSION

Grant Proposal Review

- Panel Fellow of the NSF CMMI's Game Changer Academies (CGCA) for Advancing Research Innovation

- NSF reviewer and panelist

Award Committee

- Award committee member and reviewer for the University Transportation Centers (CUTC) student awards competitions: Pikarsky Award for best Doctoral dissertation and Master thesis

- Chair of the INFORMS ENRE Best Student Paper Award; Committee member of the INFORMS ENRE Best Student Paper Award

Reviewer

- Technical Program Committee of the IEEE Blockchain

- Transportation Science

- IEEE Transactions on Intelligent Transportation Systems

- IEEE International Conference on Intelligent Transportation Systems

- IEEE Transactions on Parallel and Distributed Systems

- IEEE/ACM Transactions on Networking

- IISE Transactions, Focused Issues on Scheduling and Logistic

- IEEE Transactions on Dependable and Secure Computing

- IEEE Transactions on Services Computing

- IEEE Transactions on Cloud Computing

- IEEE Internet of Things Journal

- ASCE Journal of Infrastructure Systems

- ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems Part A: Civil Engineering

- Natural Hazards Review