Monika Filipovska

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CURRENT APPOINTMENT

Assistant Professor, Department of Civil and Environmental Engineering, University of Connecticut — Aug 2021 - present
Northwestern University

EDUCATION

Ph.D. Civil and Environmental Engineering (Transportation) — Aug 2021
Northwestern University
Dissertation: *Travel Time Reliability in Stochastic Dynamic Networks: Modeling, Path Finding and Routing*
Dissertation Advisor: Hani S. Mahmassani
Committee: David Morton, Marco Nie (Northwestern University), Jiwon Kim (University of Queensland), Ali Zockaie (Michigan State University)

M.S. in Civil and Environmental Engineering (Transportation) — Mar 2019
Northwestern University

B.S. in Engineering (Urban Systems), Mathematics — May 2017

RESEARCH INTERESTS

Dynamic Transportation Networks: Reliability Modeling, Path Finding, and Routing
Traffic Flow Characteristics: Modeling, Simulation, and Prediction
Intelligent Transportation Systems: Predictive Analytics for Real-Time Traffic Operations
Applications of Emerging Vehicle and Infrastructure Technologies
Transportation Applications of Big Data, Machine Learning and Artificial Intelligence

PUBLICATIONS

Peer-Reviewed Journal Articles

J1 **Filipovska**, M., Mahmassani, H. S. and Mittal, A. (2021) 'Estimation of Path Travel Time Distributions in Stochastic Time-Varying Networks with Correlations', *Transportation Research Record*.

J2 **Filipovska**, M. and Mahmassani, H. S. (2020) 'Traffic Flow Breakdown Prediction using Machine Learning Approaches', *Transportation Research Record*. doi: 10.1177/0361198120934480.

J3 **Filipovska**, M., Mahmassani, H. S. and Mittal, A. (2019) 'Prediction and Mitigation of Flow Breakdown Occurrence for Weather Affected Networks: Case Study of Chicago, Illinois', *Transportation Research Record*, 2673(11), pp. 628–639. doi: 10.1177/0361198119851730.

J4** **Filipovska**, M. and Mahmassani, H. S. 'Reliable Trajectory-Adaptive Routing Strategies in Stochastic, Time-Varying Networks with Generalized Correlations', (under 2nd revision)

J5** **Filipovska**, M. and Mahmassani, H. S. 'Characterization and Modeling of Stochastic Dynamic Transportation Networks with Spatio-Temporal Dependencies' (under 1st review)

Manuscripts in Preparation

M1 **Filipovska**, M. and Mahmassani, H. S. 'Modeling and Estimation of Path Travel Time Distributions in Stochastic Dynamic Networks with Spatio-Temporal Dependencies', *Transportation Research Part B: Methodological* (forthcoming submission)

M2 **Filipovska**, M. and Mahmassani, H. S. 'Information-Adaptive Routing Problems in Stochastic Dynamic Networks with Spatio-Temporal Dependencies', *European Journal of Operations Research* (forthcoming submission)

M3 **Filipovska**, M**.** and Mahmassani, H.S. 'Information-Adaptive Routing in a Connected Dynamic Environment' (forthcoming submission)

Peer-Reviewed Technical Reports

T1 Mahmassani, H. S. and **Filipovska**, M. (2021) Estimation of Travel Time Distributions Along User-Defined Travel Paths: Application Guide. U.S. Department of Transportation, Federal Highway Administration. FHWA-HOP-20-### (under revision)

T2 Mahmassani, H. S. and **Filipovska**, M. (2021) Estimation of Travel Time Distributions Along User-Defined Travel Paths: GIS Platform User Guide. U.S. Department of Transportation, Federal Highway Administration. FHWA-HOP-20-067

Peer-Reviewed Conference Contributions and Proceedings

P1 **Filipovska**, M. and Mahmassani, H. S. (2022) Approximate A Priori Path Finding for Multiple Reliability Objectives in Stochastic Dynamic Networks with Correlation. The 101st Annual Meeting of the Transportation Research Board, Washington, DC. (under review)

P2 **Filipovska**, M., Mahmassani, H. S. (2021) Information-adaptive Routing Strategies in Stochastic Dynamic Transportation Networks with Real-time Connected Vehicle Data. The 2021 Annual Meeting of the Institute for Operations Research and the Management Sciences (INFORMS). (accepted)

P3 **Filipovska**, M., Mahmassani, H. S. (2021) Information-Adaptive Routing in a Connected Dynamic Environment. 2021 24th International Conference on Intelligent Transportation Systems (ITSC). (accepted)

P4 **Filipovska**, M., Mahmassani, H. S. (2021) A Priori and Adaptive Reliable Routing in Stochastic Dynamic Networks with Correlations. International Symposium on Transportation Data and Modeling (ISTDM 2020)

P5 **Filipovska**, M., Mahmassani, H. S. (2021) Computation and Estimation of Path Travel Time Variability with Sparse Vehicle Trajectory Data. International Symposium on Transportation Data and Modeling (ISTDM 2021)

P6 **Filipovska**, M., Mahmassani, H. S. and Mittal, A. (2021) Estimation of Path Travel Time Distributions in Stochastic Time-Varying Networks with Correlations. The 100th Annual Meeting of the Transportation Research Board, Washington, DC.

P7 **Filipovska**, M., Mahmassani, H. S. (2020). Reliable Least-Time Path Estimation and Computation in Stochastic Time-Varying Vetworks with Spatio-Temporal Depencencies. 2020 23rd International Conference on Intelligent Transportation Systems (ITSC).

P8 **Filipovska**, M. and Mahmassani, H. S. (2020). Traffic Flow Breakdown Prediction using Machine Learning Approaches. The 99th Annual Meeting of the Transportation Research Board, Washington, DC.

P9 **Filipovska**, M., Mahmassani, H. S. (2020). Reliable Least-Time Path Estimation and Computation in Stochastic Time-Varying Vetworks with Spatio-Temporal Depencencies. The 99th Annual Meeting of the Transportation Research Board, Washington, DC.

P10 **Filipovska**, M., Mahmassani, H. S., & Mittal, A. (2019). Prediction and Mitigation of Flow Breakdown Occurrence for Weather Affected Networks: Case Study of Chicago, Illinois. The 98th Annual Meeting of the Transportation Research Board, Washington, DC.

P11 Jabari, S. E., Zheng, F., Liu, H., & **Filipovska**, M. (2018). Stochastic Lagrangian modeling of traffic dynamics. The 97th Annual Meeting of the Transportation Research Board, Washington, DC (No. 18-04170).

Other Conference Contributions, Presentations, Invited Talks

O1 **Filipovska,** M., Mahmassani, H. S., Du, L., (2021). Next Generation Transportation Networks: Emerging Technologies, Data Analytics, and Perspectives. *Workshop Chair and Organizer*, 2021 24th International Conference on Intelligent Transportation Systems (ITSC). (accepted)

O2 **Filipovska**, M., Mahmassani, H. S. (2020). Performance Assessment of Machine Learning Methods for Traffic Flow Breakdown Prediction. Invited Talk, Machine Learning in Science and Engineering Virtual Conference: Transportation Track, Data Science Institute, Columbia University

O3 **Filipovska**, M. (2020). Travel Time Reliability Modeling and Optimization in Stochastic Dynamic Networks. Seminar, Mathematical Challenges and Opportunities for Autonomous Vehicles Program, Institute for Pure and Applied Mathematics, University of California, Los Angeles (UCLA) (virtual due to COVID-19)

O4 **Filipovska**, M., Mahmassani, H. S. (2019). Leveraging Connected and Autonomous Vehicles for Flow Breakdown Prediction and Mitigation. Workshop on Autonomous Vehicles, Institute for Pure and Applied Mathematics, University of California, Los Angeles (UCLA)

RESEARCH GRANTS

Co-Principal Investigator, "Development of a Truck Parking Information Management System for Real-time Dissemination of Commercial Vehicle Parking Information", Federal Motor Carrier Safety Administration (FMCSA), Connecticut Department of Motor Vehicles (CTDMV), $1,726,540

RESEARCH EXPERIENCE

Dissertation Research, Travel Time Reliability in Stochastic Dynamic Networks: Modeling, Path Finding and Routing, Northwestern University Transportation Center — 2020 – 21

Lead Graduate Student Researcher, Estimation of Travel Time Distributions Along User-Defined Travel Paths, U.S. Department of Transportation, Federal Highway Administration — 2018 – 20

Graduate Student Researcher, Implementation of Analysis, Modeling and Simulation Tools for Road Weather Connected Vehicle Applications, U.S. Department of Transportation, Federal Highway Administration — 2019

Graduate Student Researcher, Integrated Modeling for Road Condition Prediction, U.S. Department of Transportation, Federal Highway Association — 2018 – 19

Postgraduate Research Assistant, Traffic State Estimation for Real-time Traffic Analysis, New York University Abu Dhabi — 2017

AWARDS & HONORS

ILITE Graduate Scholarship Award, Institute of Transportation Engineers (ITE) - Illinois Section — 2020

ITSC 2020 Best Presentation Award, *Third prize*, 23rd IEEE Intelligent Transportation Systems Conference (ITSC) — 2020

CIRTL Scholar Certificate, Center for Integration of Research, Teaching and Learning (CIRTL) Network — 2020

Fellow and Core Participant, Mathematical Challenges and Opportunities for Autonomous Vehicles, Institute for Pure and Applied Mathematics, University of California, Los Angeles (UCLA) (remote due to COVID-19) — 2020

CIRTL Associate Certificate, Center for Integration of Research, Teaching and Learning (CIRTL) Network — 2019

Walter P. Murphy Fellow, McCormick School of Engineering, Northwestern University — 2017-18

TEACHING AND ADVISING EXPERIENCE

Instructor

Transportation Planning, Department of Civil and Environmental Engineering, University of Connecticut — Fall 2021

Operations Research in Civil and Environmental Engineering, Department of Civil and Environmental Engineering, University of Connecticut — Spring 2022

Co-Instructor

Civil and Environmental Engineering Systems Analysis, Department of Civil and Environmental Engineering, Northwestern University — Spring 2021
Co-Instructor: Pablo Durango-Cohen

Data Analytics for Transportation and Urban Infrastructure Systems, Department of Civil and Environmental Engineering, Northwestern University — Spring 2020
Co-Instructor: Ying Chen

Teaching Assistant

Engineering Analysis-3 Systems Dynamics, Department of Mechanical Engineering, Northwestern University — Spring 2018

Calculus I, Courant Institute of Mathematical Sciences, New York University — Spring 2016

Training and Certification

Teaching Certificate Program, Searle Center for Advancing Learning and Teaching, Northwestern University — 2020-21

CIRTL Network Scholar, Center for the Integration of Research, Teaching and Learning (CIRTL) Network — 2020

Searle Teaching-As-Research (STAR), CIRTL at Northwestern — 2020
Project: *Content Relevance and Social Pedagogies: Fostering Student Motivation in a Blended Learning Environment,*
Course Context: Data Analytics for Transportation and Urban Infrastructure Applications

Introduction to Evidence-Based Undergraduate STEM Teaching, Massive Online Open Course, Center for the Integration of Research, Teaching and Learning (CIRTL) Network — 2019

PROFESSIONAL DEVELOPMENT

Mathematical Challenges and Opportunities for Autonomous Vehicles Program, *Fellow and Core Participant*, Institute of Pure and Applied Mathematics, University of California, Los Angeles (UCLA) — 2020-21

Workshop on Autonomous Vehicles, Institute of Pure and Applied Mathematics, University of California, Los Angeles (UCLA) — 2019

SERVICE

Professional Service

Journal Referee Service:

Transportation Research Board Annual Meeting / Transportation Research Record

IEEE Transactions on Intelligent Transportation Systems

Organizer / Chair:

Chair and Co-Organizer, Next Generation Transportation Networks: Emerging Technologies, Data Analytics, and Perspectives. *Workshop*, 24th International Conference on Intelligent Transportation Systems (ITSC).

Professional Activities

Member, IEEE Intelligent Transportation Systems Society (ITSS)

Member, Institute for Operations Research and the Management Sciences (INFORMS)

Member, Transportation Science and Logistics Society (TSL) of INFORMS

Member, Institute of Transportation Engineers (ITE)

Member, Institute of Transportation Engineers (ITE) Councils and Committees:

Transportation Systems Management & Operation (TSM&O) Council

Connected and Autonomous Vehicles Standing Committee

Traffic Engineering Council

Transportation Education Council

Member, Transportation Research Forum (TRF)

Friend, Transportation Research Board (TRB) Standing Committees on:

Transportation Network Modeling (AEP40)

Traffic Flow Theory and Characteristics (ACP50)

Intelligent Transportation Systems (ACP15)

Statistical Methods (AED60)

Leadership and Institutional Service

Northwestern University Chapter of the American Society of Civil Engineers (NU-ASCE)

Northwestern University Student Chapter of the Institute for Operations Research and the Management Sciences (INFORMS)

Women in Science and Engineering Research (WISER), Northwestern University

Graduate Chapter of the Society of Women Engineers (GradSWE), Northwestern University

Undergraduate Curriculum Committee Student Representative, New York University Abu Dhabi

Engineering Division Student Representative: New York University Abu Dhabi