Monika Filipovska
Ph.D. Candidate

Northwestern University Transportation Center
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EDUCATION

Northwestern University, Evanston IL

Ph.D. Candidate in Civil and Environmental Engineering   Expected   2021
Transportation Systems Analysis and Planning
    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)
    Major GPA: 3.9

Northwestern University, Evanston IL   2019

M.S. in Civil and Environmental Engineering
Transportation Systems Analysis and Planning
    Major GPA: 3.8

New York University Abu Dhabi, Abu Dhabi, UAE   2017

B.S. in Engineering
Urban Systems: Smart Cities
    Major GPA: 3.7
    Thesis: *A Gauss-Markov random field approach for microscopic traffic estimation*
    Thesis Advisor: Saif E. Jabari
B.S. in Mathematics
    Major GPA: 3.6

RESEARCH INTERESTS

Transportation Network and Systems Modeling: Analytical and Simulation Approaches
Applied Optimization: Dynamic and Stochastic Problems in Transportation
Intelligent Transportation Systems: Predictive Analytics for Real-Time Traffic Operations
Stochastic Optimization and Probabilistic Machine Learning: Travel Reliability Applications
Big Data, Machine Learning and Artificial Intelligence: Applications in Transportation

AWARDS & HONORS

ITSC 2020 Best Presentation Award, *Third prize***,** 2020 23rd Intelligent Transportation
Systems Conference
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)
Walter P. Murphy Fellow, Northwestern University McCormick School of Engineering

PEER-REVIEWED JOURNAL ARTICLES

J1   **Filipovska**, M. and Mahmassani, H. S. (2020) Traffic Flow Breakdown Prediction using Machine Learning Approaches. Transportation Research Record. doi: 10.1177/0361198120934480.

J2   **Filipovska**, M., Mahmassani, H. S., & Mittal, A. (2019). Prediction and Mitigation of Flow Breakdown Occurrence for Weather Affected Networks: Case Study of Chicago, Illinois. Transportation Research Record, 0361198119851730.

J3   **Filipovska**, M. and Mahmassani, H. S. Estimation of Path Travel Time Distributions in
**   Stochastic Time-Varying Networks with Correlations. Transportation Research Record. (under 1st revision)

J4   **Filipovska**, M. and Mahmassani, H. S. Reliable Trajectory-Adaptive Routing Strategies in
**   Stochastic, Time-Varying Networks with Generalized Correlations. Transportation Research Part C. (under 1st review)

TECHNICAL REPORTS

T1   Mahmassani, H. S., and **Filipovska**, M. (2020) Estimation of Travel Time Distributions Along User-Defined Travel Paths: Application Guide. U.S. Department of Transportation, Federal Highway Administration. FHWA-HOP-20-###

T2   Mahmassani, H. S., and **Filipovska**, M. (2020) 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., 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). (virtual due to COVID-19).

P2   **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.

P3   **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.

P4   **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.

P5   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).

MANUSCRIPTS IN PREPARATION

M1 **Filipovska**, M. and Mahmassani, H. S. Characterization and Modeling of Stochastic Dynamic Transportation Networks with Spatio-Temporal Dependencies.

M2 **Filipovska**, M. and Mahmassani, H. S. Modeling and Estimation of Path Travel Time Distributions in Stochastic Dynamic Networks with Spatio-Temporal Dependencies

M3 **Filipovska**, M. and Mahmassani, H. S. Information-Adaptive Routing Problems in Stochastic Dynamic Networks with Spatio-Temporal Dependencies

OTHER CONFERENCE CONTRIBUTIONS, PRESENTATIONS, INVITED TALKS

O1 **Filipovska**, M., Mahmassani, H. S. A Priori and Adaptive Reliable Routing in Stochastic Dynamic Networks with Correlations. International Symposium on Transportation Data and Modeling (ISTDM) (postponed to 2021 due to COVID-19).

O2 **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)

O3 **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 EXPERIENCE

Travel Time Reliability in Stochastic Dynamic Networks: Characterization, Modeling, Path Finding and Routing, Northwestern University Transportation Center	Jun. 2020 - Ongoing

Dissertation Research

Methods for characterization of stochastic dynamic networks, developing approaches for modeling path travel time distributions with spatio-temporal dependencies, algorithms and heuristics for a priori and adaptive path finding under uncertainty, routing guidance for improved travel time reliability

Estimation of Travel Time Distributions Along User-Defined Travel Paths, U.S. Department of Transportation, Federal Highway Association	2018 - 20

Lead Graduate Student Researcher

Developing methods and models for the estimation of travel time distributions in large-scale urban networks using numerical integration, simulation, and data-driven methods.

Implementation of Analysis, Modeling and Simulation Tools for Road Weather Connected Vehicle Applications, U.S. Department of Transportation, Federal Highway Association	2019

Graduate Student Researcher

Application of analysis, simulation and modeling tools for traffic and demand management strategies, mobility applications, weather-related maintenance strategies using connected vehicle data.

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

Graduate Student Researcher

Developed and tested models for traffic speed estimation and prediction using time-series analysis approaches.

Traffic State Estimation for Real-time Traffic Analysis, New York University Abu Dhabi	2017

Postgraduate Research Assistant

TEACHING EXPERIENCE

Co-Instructor, Civil and Environmental Engineering, Northwestern University *CIV_ENV 304: Civil and Environmental Engineering Systems Analysis* Developing and teaching 2 of 4 course modules *Co-Instructor:* Pablo Durango-Cohen	Spring 2021
Co-Instructor, Civil and Environmental Engineering, Northwestern University *CIV_ENV 495: Data Analytics for Transportation and Urban Infrastructure Systems* Taught an on-going application-focused module *Co-Instructor:* Ying Chen	Spring 2020
Teaching Assistant, Mechanical Engineering, Northwestern University *GEN-ENG 205-3: Engineering Analysis-3 Systems Dynamics*	Spring 2018
Teaching Assistant, Courant Institute of Mathematical Sciences, New York University *MATH-UA 121: Calculus I*	Spring 2016

TRAINING AND DEVELOPMENT

Fellow and Core Participant, *Mathematical Challenges and Opportunities for Autonomous Vehicles Program*, Institute of Pure and Applied Mathematics, University of California, Los Angeles (UCLA)	2020-21
Participant, *Teaching Certificate Program,* Searle Center for Advancing Learning and Teaching, Northwestern University	2020-21
CIRTL Network Practitioner, Center for the Integration of Research, Teaching and Learning (CIRTL) Network	2020
Participant, Searle Teaching-As-Research (STAR), CIRTL at Northwestern *Content Relevance and Social Pedagogies: Fostering Student Motivation in a Blended Learning Environment,* Course Context: CIV_ENV 495 Data Analytics for Transportation and Urban Infrastructure Applications	2020
Participant, *Workshop on Autonomous Vehicles,* Institute of Pure and Applied Mathematics, University of California, Los Angeles (UCLA)	2019

PROFESSIONAL SERVICE

Transportation Research Board Annual Meeting / Transportation Research Record (5)
IEEE Transactions on Intelligent Transportation Systems (1)

PROFESSIONAL ACTIVITIES

Student Member: IEEE Intelligent Transportation Systems Society (ITSS)
Student Member: Transportation Research Forum (TRF)
Student Member: Institute of Transportation Engineers (ITE)

LEADERSHIP AND INSTITUTIONAL SERVICE

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

Member: Women in Science and Engineering Research (WISER) at Northwestern University

Member: Graduate Chapter of the Society of Women Engineers (GradSWE) at Northwestern University

Student Body Representative: Undergraduate Curriculum Committee, New York University Abu Dhabi

Engineering Division Student Representative: New York University Abu Dhabi

TECHNICAL SKILLS

Programming and Computing:
Python, R, MATLAB, Weka in Java, STATA, Gurobi, AMPL, LaTeX, Microsoft Office Suite

Simulation Software:
ArcGIS, QGIS, SUMO (Simulation of Urban Mobility), Cube Dynasim, Vissim, DYNASMART