Seongjin Choi

http:/choi-seongjin.github.io

Email : chois@umn.edu

Education

- **Korea Advanced Institute of Science and Technology** — Daejeon, South Korea
  Doctor of Philosophy in Civil and Environmental Engineering — *Mar. 2017 – Aug. 2021*
  Dissertation: Deep-Learning based Urban Vehicle Trajectory Analytics — *Advisor: Hwasoo Yeo*

- **Korea Advanced Institute of Science and Technology** — Daejeon, South Korea
  Master of Science in Civil and Environmental Engineering — *Sep. 2015 – Feb. 2017*
  Thesis: Development of Simulation-based Lane Change Control for Autonomous Vehicles — *Advisor: Hwasoo Yeo*

- **Korea Advanced Institute of Science and Technology** — Daejeon, South Korea
  Bachelor of Science in Civil and Environmental Engineering — *Feb. 2011 – Aug.2015*

Career

- **Assistant Professor** — University of Minnesota
  Department of Civil, Environmental, and Geo- Engineering — *Jan. 2024 – present*
  - ***Research Focus**:*
    - *AI/GenAI for transportation and mobility systems*
    - *Spatiotemporal data modeling*
    - *Connected Automated Vehicles & Cooperative-ITS*
  - ***Teaching**:*
    - *CEGE 8490 - Generative AI in Transportation Research (graduate) - 2025 Fall*
    - *CEGE 4160/5180 - Applied Machine Learning for Civil, Environmental, and Geo-Engineers - 2025 Spring (undergraduate/graduate)*
    - *CEGE 3101 - Computer Applications I (undergraduate) - 2024 Spring*

Selected Publications

[S1] Ryu, Seunghee, Donghoon Kwon, **Seongjin Choi**†, Aryan Deshwal, Seungmo Kang, Carolina Osorio. "BO4Mob: Bayesian Optimization Benchmarks for High-Dimensional Urban Mobility Problem" *The Thirty-Ninth Annual Conference on Neural Information Processing Systems (NeurIPS 2025)* (December 2025).[†**Corresponding author**]

[S2] **Choi, Seongjin**, Zhixiong Jin, Seung Woo Ham, Jiwon Kim, and Lijun Sun. "A gentle introduction and tutorial on deep generative models in transportation research," *Transportation Research Part C: Emerging Technologies*, 176, (2025): 105145. **[JCR Q1; IF=8.3]**

[S3] **Choi, Seongjin**, Nicolas Saunier, Vincent Zhihao Zheng, Martin Trepanier, and Lijun Sun. "Scalable dynamic mixture model with full covariance for probabilistic traffic forecasting." *Transportation Science* (2025).

[S4] **Choi, Seongjin**, and Jinwoo Lee. "Optimal planning of parking infrastructure and fleet size for Shared Autonomous Vehicles." *Transportation Research Part E: Logistics and Transportation Review*, 176, (2023): 103213. **[JCR Q1; IF=10.6]**

[S5] **Choi, Seongjin***, Donghoun Lee*, Sari Kim and Sehyun Tak. "Framework for Connected and Automated Bus Rapid Transit with Sectionalized Speed Guidance based on Deep Reinforcement Learning: Field Test in Sejong City." *Transportation Research Part C: Emerging Technologies*, 148, (2023): 104049. **[JCR Q1; IF=8.3]**

[S6] **Choi, Seongjin**, Jiwon Kim, and Hwasoo Yeo. "TrajGAIL: Generating Urban Vehicle Trajectories using Generative Adversarial Imitation Learning." *Transportation Research Part C: Emerging Technologies*, 128, (2021): 103091. **[JCR Q1; IF=8.3]**

Previous Career

- **Postdoctoral Researcher at Smart Transportation Lab**
  Fully funded from McGill University
  Supervised by Prof. Lijun Sun — McGill University
  - ***Project**: Bridging Data-Driven and Behavioral Models for Transportation (IVADO)*
    ***Responsibility**: Spatiotemporal Forecasting, Spatiotemporal Residual Correction, Multi-agent reinforcement learning for cooperative adaptive cruise control (CACC), Deep Generative Models* — *Jan. 2022 – Dec. 2023*
    ***Collaboarators**: Prof. Nicolas Saunier (Polytechnique Montreal), Professor Martin Trepanier (Polytechnique Montreal), Professor Fracesco Ciari (Polytechnique Montreal)*

- **Postdoctoral Researcher at AIxMobility Lab**
  Fully funded from KAIST
  Supervised by Prof. Hwasoo Yeo — KAIST
  - ***Project**: Development of Multi-level Traffic Simulation for C-ITS and CAV*
    ***Responsibility**: Designing overall system architecture and data structure, Developing core functions including lane-changing-model and car-following-model, Deploying cloud-based simulator using Microsoft Azure, Developing scenario generator based on real-time data collected in Sejong city* — *Sep. 2021 - Nov. 2021*
    ***Collaboarators**: Dr. Sehyun Tak (Korea Transport Institute), Dr. Donghoun Lee (Korea Transport Institute)*
  - ***Project**: Development of Cloud-based Demand-Responsive Routing System*
    ***Responsibility**: Designing cloud system architecture on Microsoft Azure, Optimizing computation for real-time applications*

- **Visiting scholar at the University of Queensland**
  Funded from BK21+ (Brain Korea 21 Plus)
  Supervised by Prof. Jiwon Kim — University of Queensland
  - ***Project**: Deep learning applications in urban vehicle trajectory analytics*
    ***Responsibility**: Research conceptualization, Problem design, model development, result analysis, writing and editing* — *May. 2017 – Aug. 2017*, *Sep. 2018 – Nov. 2018*
    ***Achievements**: 2 journal papers, 2 conference presentations*

Funded Projects (Total funding: $1,317,104; $699,624 for Choi)

- University of Minnesota Center for Transportation Studies "Embedding Human-Understandable Symbolic Rules into Vision-Language Decision Systems for Safe, Transparent, and Ethical Autonomous Driving," $75,000, (02/01/2026-01/31/2027) **PI Choi**
- Minnesota Department of Transportation (MnDOT) "Img2Speed: Generative AI and Multimodal Machine Learning for Predicting Operating Speed Distributions from Roadway Design and Context," $166,846, (08/01/2026-06/30/2028) **PI Choi**
- University of Minnesota, Data Science Initiative (DSI), GenAI4Science Seed Projects. "Physics-informed Generative Model for High-Resolution Traffic State Estimation and Optimal Sensor Placement," $67,110 (01/01/2026-12/31/2026) **PI Choi**
- Minnesota Department of Transportation (MnDOT) "Detector Data Artificial Intelligence (AI)," $84,712, (10/01/2025-09/30/2026) **PI Choi**
- Korea Transport Institute "Research on Search-Augmented Generation Techniques Based on Traffic Simulation for Numerical AI," $21,045 (30M KRW), (05/01/2025-02/28/2026) **PI Choi**
- National Research Foundation of Korea "K-health-mobility: Multi-layer digital twin of healthcare and mobility and supplementary system design for vulnerable groups using a synthetic population of an aging society," $670,391 (960M KRW) ($240,275 for Choi), (03/01/2025-03/01/2029), PI Woo, **Co-PI Choi**

- Minnesota Department of Transportation (MnDOT) and Local Road Research Board (LRRB) "Estimating Likely Mode Shift and VMT Reduction Potential using TBI Data and AI Algorithms," $198,000 ($10,636 for Choi), (07/01/2025 - 06/30/2027), PI Khani **Co-PI Choi**
- University of Minnesota Center for Transportation Studies, "CTS Infrastructure Grant", $9,000, **PI Choi**
- University of Minnesota Center for Transportation Studies, "Digitizing Minnesota Transportation Observatory Data", $10,000, (07/01/2024 – 06/30/2026), **PI Choi**
- University of Minnesota Center for Transportation Studies Faculty Fellows, "General Framework for Modeling Probabilistic Traffic Data Imputation and Forecasting as Inverse Problem using Deep Generative Prior", $15,000, (07/01/2024 – 06/30/2026), **PI Choi**

Professional Services

- **Member**
  Transportation Research Board
  AED50(7) Subcommittee on Edge Computing *2025-present*
- **Member**
  CTS Transportation Safety and Mobility Council *2024-present*
- **Member**
  Transportation Research Board
  AED50(6) Subcommittee on Artificial Intelligence Ethics and Equity *2024-present*
- **Editorial Member**
  Journal of Korean Society of Transport *2023-present*
- **Program Committee**
  Socially Interactive Autonomous Mobility (SIAM) *2024*
- **Guest Editor**
  Journal of Advanced Transportation (Special Issue)
  Advanced Data Intelligence Theory and Practice in Transportation 2023 *2023*
- **Reviewer**
  Transportation Research Part C: Emerging Technologies
  IEEE Transactions on Intelligent Transportation Systems
  IEEE Open Journal of Intelligent Transportation Systems
  Scientific Data
  Transportation Research Records
  Energy
  EURO Journal on Transportation and Logistics
  Physica A: Statistical Mechanics and its Applications
  Sensors
  IEEE International Conference on Intelligent Transportation Systems
  IEEE Intelligent Vehicles Symposium
  Transportation Research Board Annual Meeting

Advising Experience

- Christopher Cheong, Ph.D. student, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota.
- Lindong Liu, Ph.D. student, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota.
- Pouya Parsa, Master student, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota.
- Ross Volkov, Master student, Data Science Program, University of Minnesota.

- Mitch Kosieradzki, Master student, Data Science Program, University of Minnesota.
- Saravanan Rammesh Adhav, Master student, Robotics, University of Minnesota.
- Kalyan Lankireddy, Master student, Robotics, University of Minnesota.
- Christopher Herr, Master student, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota.
- Xiaohuan Zeng, Ph.D. student (Ph.D. Oral Preliminary Exam Committee), Department of Geogrraphy, University of Minnesota.
- Arian Zare, Ph.D. student (Ph.D. Oral Preliminary Exam Committee), Department of Civil, Environmental, and Geo- Engineering, University of Minnesota.
- Behnam Davazdah Emami, Ph.D. student (Ph.D. Final Exam Committee), Department of Civil, Environmental, and Geo- Engineering, University of Minnesota.
- Kwangho Baek, Ph.D. student (Ph.D. Oral Preliminary Exam Committee), Department of Civil, Environmental, and Geo- Engineering, University of Minnesota.
- Tianyi Li, Ph.D. student (Ph.D. Defense Committee), Department of Civil, Environmental, and Geo-Engineering, University of Minnesota.

Full List of Publications

— Publications Under Review

Kosieradzki, Mitch, **Choi**, **Seongjin** (2026a). "TrajFlow: A Generative Framework for Occupancy Density Estimation Using Normalizing Flows". Submitted to AI for Transportation.

Cheong, Christopher, Davis, Gary, **Choi**, **Seongjin** (2026). "Weaver: Kronecker Product Approximations of Spatiotemporal Attention for Traffic Network Forecasting". Submitted to Transportation Research Part C.

Liu, Lindong, Jin, Zhixiong, **Choi**, **Seongjin** (2026). "PMA-diffusion: A Physics-guided Mask-aware Diffusion Framework for Traffic State Estimation from Sparse Observations". Submitted to Transportation Research Part C.

Min, Donggyu, **Choi**, **Seongjin**, Kim, Dong-Kyu (2026a). "Deep Reinforcement Learning for Dynamic Origin-Destination Matrix Estimation in Microscopic Traffic Simulations Considering Credit Assignment". Submitted to Transportation Research Part C.

Ryu, Seunghee, Kang, Seungmo, **Choi**, **Seongjin** (2026a). "Multi-Fidelity Surrogate-Based Optimization for Passenger-Centric Bus Berth Allocation in Urban Transit Hubs". Submitted to Transportation Research Part C.

— International Journal

Cho, Jungwoo, **Choi**, **Seongjin** (2026). "Toward Safe Integration of UAM in Terminal Airspace: UAM Route Feasibility Assessment Using Probabilistic Aircraft Trajectory Prediction". In: *IEEE Transactions on Intelligent Transportation Systems*. Early Access, pp. 1–10. https://doi.org/10.1109/TITS.2026.3651399.

Kim, Yeeun, **Choi**, **Seongjin**, Jeon, Sujae, Yeo, Hwasoo (2026). "NextSim: Multi-Level Traffic Simulation for Urban Networks Using Dynamic Level Assignment". In: *IEEE Transactions on Intelligent Transportation Systems*. Early Access, pp. 1–15. https://doi.org/10.1109/TITS.2026.3671220.

Lin, Tengfeng, Jin, Zhixiong, **Choi**, **Seongjin**, Yeo, Hwasoo (2025). "Predicted lane-based time to collision: A novel surrogate safety measure for pedestrian potential risk evaluation at non-signalized intersections". In: *Transportation Research Interdisciplinary Perspectives* 34, p. 101705. https://doi.org/10.1016/j.trip.2025.101705.

Choi, **Seongjin**, Jin, Zhixiong, Ham, Seung Woo, Kim, Jiwon, Sun, Lijun (2025). "A gentle introduction and tutorial on deep generative models in transportation research". In: *Transportation Research Part C: Emerging Technologies* 176, p. 105145. https://doi.org/10.1016/j.trc.2025.105145.

Choi, **Seongjin**, Saunier, Nicolas, Zheng, Vincent Zhihao, Trépanier, Martin, Sun, Lijun (2025). "Scalable Dynamic Mixture Model with Full Covariance for Probabilistic Traffic Forecasting". In: *Transportation Science* 59.4. Available at arXiv: https://arxiv.org/abs/2212.06653, pp. 708–720. https://doi.org/10.1287/trsc.2024.0547.

Zheng, Vincent Zhihao, **Choi**, **Seongjin**, Sun, Lijun (2025). "Probabilistic Traffic Forecasting with Dynamic Regression". In: *Transportation Science* 59.4. Available at arXiv: https://arxiv.org/abs/2301.06650, pp. 689–707. https://doi.org/10.1287/trsc.2024.0560.

Zheng, Vincent Zhihao, **Choi**, **Seongjin**, Sun, Lijun (2024a). "Better batch for deep probabilistic time series forecasting". In: *Proceedings of The 27th International Conference on Artificial Intelligence and Statistics*. Vol. 238. Proceedings of Machine Learning Research. https://proceedings.mlr.press/v238/zheng24a.html, pp. 91–99.

Choi, **Seongjin**, Lee, Jinwoo (2023a). "Optimal planning of parking infrastructure and fleet size for Shared Autonomous Vehicles". In: *Transportation Research Part E: Logistics and Transportation Review* 176, p. 103213. https://doi.org/10.1016/j.tre.2023.103213.

Choi, **Seongjin**, Lee, Donghoun, Kim, Sari, Tak, Sehyun (2023). "Framework for Connected and Automated Bus Rapid Transit with Sectionalized Speed Guidance based on deep reinforcement learning: Field test in Sejong City". In: *Transportation Research Part C: Emerging Technologies* 148, p. 104049. https://doi.org/10.1016/j.trc.2023.104049.

Jin, Zhixiong, Kim, Jiwon, Yeo, Hwasoo, **Choi**, **Seongjin** (2022). "Transformer-based map-matching model with limited labeled data using transfer-learning approach". In: *Transportation Research Part C: Emerging Technologies* 140. Corresponding author, p. 103668. https://doi.org/10.1016/j.trc.2022.103668.

Tak, Sehyun, **Choi**, **Seongjin** (2022). "Safety Monitoring System of CAVs Considering the Trade-Off between Sampling Interval and Data Reliability". In: *Sensors* 22.10. Corresponding author, p. 3611. https://doi.org/10.3390/s22103611.

Choi, **Seongjin**, Kim, Jiwon, Yeo, Hwasoo (2021). "TrajGAIL: Generating urban vehicle trajectories using generative adversarial imitation learning". In: *Transportation Research Part C: Emerging Technologies* 128. Source code available at https://github.com/benchoi93/TrajGAIL, p. 103091. https://doi.org/10.1016/j.trc.2021.103091.

Kim, Yeeun, **Choi**, **Seongjin**, Yeo, Hwasoo (2020). "Extended Urban Cell Transmission Model Using Agent-based Modeling". In: *Procedia Computer Science* 170, pp. 354–361. https://doi.org/10.1016/j.procs.2020.03.058.

Choi, **Seongjin**, Kim, Jiwon, Yeo, Hwasoo (2019a). "Attention-based Recurrent Neural Network for Urban Vehicle Trajectory Prediction". In: *Procedia Computer Science* 151, pp. 327–334. https://doi.org/10.1016/j.procs.2019.04.046.

Lee, Donghoun, Tak, Sehyun, **Choi**, **Seongjin**, Yeo, Hwasoo (2019a). "Development of Risk Predictive Collision Avoidance System and Its Impact on Traffic and Vehicular Safety". In: *Transportation Research Record: Journal of the Transportation Research Board* 2673.7, pp. 454–465. https://doi.org/10.1177/0361198119836972.

Kim, Yeeun, **Choi**, **Seongjin**, Park, Jihyuk, Yeo, Hwasoo (2019a). "Agent-based Mesoscopic Urban Traffic Simulation based on Multi-lane Cell Transmission Model". In: *Procedia Computer Science* 151, pp. 240–247. https://doi.org/10.1016/j.procs.2019.04.035.

Choi, **Seongjin**, Yeo, Hwasoo, Kim, Jiwon (2018a). "Network-Wide Vehicle Trajectory Prediction in Urban Traffic Networks using Deep Learning". In: *Transportation Research Record: Journal of the Transportation Research Board* 2672.45, pp. 173–184. https://doi.org/10.1177/0361198118794735.

Choi, **Seongjin**, Suh, Jonghae, Yeo, Hwasoo (2017). "Microscopic Analysis of Climbing Lane Performance at Freeway Uphill Section". In: *Transportation Research Procedia* 21, pp. 98–109. https://doi.org/10.1016/j.trpro.2017.03.081.

— Peer-reviewed International Conference

Liu, Lindong, **Choi**, **Seongjin** (2026). *PMA-diffusion: A Physics-guided Mask-aware Diffusion Framework for Traffic State Estimation from Sparse Observations*. The 105th Transportation Research Board Annual Meeting, January 2026. Corresponding author.

Kosieradzki, Mitch, **Choi**, **Seongjin** (2026b). *TrajFlow: A Generative Framework for Occupancy Density Estimation Using Normalizing Flows*. The 105th Transportation Research Board Annual Meeting, January 2026. Corresponding author.

Kwon, Donghoon, Kang, Seungmo, **Choi**, **Seongjin** (2026). *TrafficNetQA: Question Answering Benchmark for Evaluating LLM Performance on Traffic Network Files*. The 105th Transportation Research Board Annual Meeting, January 2026. Corresponding author.

Ryu, Seunghee, Kang, Seungmo, **Choi**, **Seongjin** (2026b). *Multi-Fidelity Surrogate-Based Optimization for Passenger-Centric Bus Berth Allocation in Urban Transit Hubs*. The 105th Transportation Research Board Annual Meeting, January 2026. Corresponding author.

Choi, **Seongjin**, Jin, Zhixiong, Ham, Seung Woo, Kim, Jiwon, Sun, Lijun (2026). *A Gentle Introduction to Deep Generative Models in Transportation Research*. The 105th Transportation Research Board Annual Meeting, January 2026.

Ryu, Seunghee, Kwon, Donghoon, **Choi**, **Seongjin**, Deshwal, Aryan, Kang, Seungmo, Osorio, Carolina (2026). *BO4Mob: Bayesian Optimization Benchmarks for High-Dimensional Urban Mobility Problem*. The 105th Transportation Research Board Annual Meeting, January 2026. Corresponding author.

Min, Donggyu, **Choi**, **Seongjin**, Kim, Dong-Kyu (2026b). *Deep Reinforcement Learning for Dynamic Origin-Destination Matrix Estimation in Microscopic Traffic Simulations Considering Credit Assignment*. The 105th Transportation Research Board Annual Meeting, January 2026.

Parsa, Pouya, Li, Keya, Kockelman, Kara M., **Choi**, **Seongjin** (2026). *Video-based Vehicle Surveillance in the Wild: License Plate, Make, and Model Recognition with Self Reflective Vision-Language Models*. The 105th Transportation Research Board Annual Meeting, January 2026. Corresponding author.

Liu, Lindong, **Choi**, **Seongjin** (2025). *PMA-diffusion: A Physics-guided Mask-aware Diffusion Framework for Traffic State Estimation from Sparse Observations*. NeurIPS Workshop on Urban AI, December 2025. Corresponding author.

Jiang, Sicong, Huang, Zilin, Qian, Kangan, Luo, Ziang, Zhu, Tianze, Zhong, Yang, Tang, Yihong, Kong, Menglin, Wang, Yunlong, Jiao, Siwen, Ye, Hao, Sheng, Zihao, Zhao, Xin, Wen, Tuopu, Fu, Zheng, Chen, Sikai, Jiang, Kun, Yang, Diange, **Choi**, **Seongjin**, Sun, Lijun (2025). *A Survey on Vision-Language-Action Models for Autonomous Driving*. ICCV 2025 Workshop on Distillation of Foundation Models for Autonomous Driving, October 2025. Available at https://arxiv.org/abs/2506.24044. GitHub: https://github.com/JohnsonJiang1996/Awesome-VLA4AD.

Ryu, Seunghee, Kwon, Donghoon, **Choi**, **Seongjin**, Deshwal, Aryan, Kang, Seungmo, Osorio, Carolina (2025). *BO4Mob: Bayesian Optimization Benchmarks for High-Dimensional Urban Mobility Problem*. The Thirty-Ninth Annual Conference on Neural Information Processing Systems, December 2025. Corresponding author.

Kwon, Donghoon, Kang, Seungmo, **Choi**, **Seongjin** (2025). *TrafficNetQA: Question Answering Datasets for Evaluating LLM Performance on Traffic Network Files*. International Conference on Advances in Geographic Information Systems 2025 (ACM SIGSPATIAL 2025), November 2025. Corresponding author.

Parsa, Pouya, Li, Keya, Kockelman, Kara M., **Choi**, **Seongjin** (2025). *Video-based Vehicle Surveillance in the Wild: License Plate, Make, and Model Recognition with Self Reflective Vision-Language Models*. Bridging Transportation Researchers Conference 7, August 2025. Corresponding author.

Liu, Fuqiang, Jiang, Sicong, Miranda-Moreno, Luis, **Choi**, **Seongjin**, Sun, Lijun (2025). *Adversarial Vulnerabilities in Large Language Models for Time Series Forecasting*. AISTATS 2025, May 2025. Corresponding author.

Cheong, Christopher, **Choi**, **Seongjin** (2025). *Weaver: A Spatio-Temporal Deep Learning Model Architecture Based on the Mixed Kronecker Matrix-Vector Identity*. The 104th Transportation Research Board Annual Meeting, January 2025. Corresponding author.

Liu, Fuqiang, Jiang, Sicong, Miranda-Moreno, Luis, **Choi**, **Seongjin**, Sun, Lijun (2024). *Adversarial Vulnerabilities in Large Language Models for Time Series Forecasting*. NeurIPS 2024 Safe Generative AI Workshop, December 2024. Corresponding author.

Choi, **Seongjin**, Rodriguez, Sergio, Osorio, Carolina (2024). *Bayesian Optimization for High-dimensional Urban Mobility Problems*. NeurIPS 2024 Workshop on Bayesian Decision-making and Uncertainty, December 2024.

Li, Tianyi, Wang, Shian, Shang, Mingfeng, **Choi**, **Seongjin**, Stern, Raphael (2024). *A Customizable Neural Network based Framework for Autonomous Vehicle Control with Human-Guided Learning*. IEEE Intelligent Transportation Systems Conference (ITSC) 2024 Workshop on Large-Scale Smart Mobility, September 2024.

Zheng, Vincent Zhihao, **Choi**, **Seongjin**, Sun, Lijun (2024b). *Better batch for deep probabilistic time series forecasting*. The 27th International Conference on Artificial Intelligence and Statistics (AISTATS), May 2024.

Choi, **Seongjin**, Lee, Jinwoo (2024). *An Analytical Model for Parking Infrastructure and Fleet Size Planning in Shared Autonomous Vehicle Systems with Spatio-Temporal Heterogeneity*. The 103rd Transportation Research Board Annual Meeting, January 2024.

Jiang, Sicong, **Choi**, **Seongjin**, Sun, Lijun (2024). *Communication-Aware Reinforcement Learning for Cooperative Adaptive Cruise Control*. The 103rd Transportation Research Board Annual Meeting, January 2024.

Zheng, Vincent Zhihao, **Choi**, **Seongjin**, Sun, Lijun (2024c). *Deep Probabilistic Traffic Forecasting with Correlated Errors*. The 103rd Transportation Research Board Annual Meeting, January 2024.

Kim, Yeeun, **Choi**, **Seongjin**, Jeon, Sujae, Yeo, Hwasoo (2024). *Multi-Level Traffic Simulation Using Dynamic Simulation Level Assignment for Urban Network*. The 103rd Transportation Research Board Annual Meeting, January 2024.

Choi, **Seongjin**, Lee, Jinwoo (2023b). *Analytical Parking Planning Model with Shared Autonomous Vehicles*. The 102nd Transportation Research Board Annual Meeting, January 2023.

Lin, Tengfeng, **Choi**, **Seongjin**, Jin, Zhixiong, Yeo, Hwasoo (2023). *Evaluation of Pedestrian's Potential Risk at Non-signalized Intersection Based on Predicted Post-Encroachment Time using Deep Learning Methods*. The 102nd Transportation Research Board Annual Meeting, January 2023.

Choi, **Seongjin**, Saunier, Nicolas, Trepanier, Martin, Sun, Lijun (2022). *Spatiotemporal Residual Regularization with Kronecker Product Structure for Traffic Forecasting*. Thirty-sixth Conference on Neural Information Processing Systems (NeurIPS 2022), Workshop on Gaussian Processes, Spatiotemporal Modeling, and Decision-making Systems, December 2022.

Lin, Tengfeng, Jin, Zhixiong, **Choi**, **Seongjin**, Yeo, Hwasoo (2022). *A Framework for Pedestrian Sub-classification and Arrival Time Prediction at Signalized Intersection Using Preprocessed Lidar Data*. The 101st Transportation Research Board Annual Meeting, January 2022.

Jin, Zhixiong, **Choi**, **Seongjin**, Yeo, Hwasoo (2022). *Transformer-based Map Matching with Model Limited Ground-Truth Data using Transfer-Learning Approach*. TRB 2022 Annual Meeting, January 2022.

Choi, **Seongjin**, Kim, Jiwon, Park, Min Ju, Yeo, Hwasoo (2021). *TrajGAIL: Generating Urban Trajectories using Generative Adversarial Imitation Learning*. The 100th Transportation Research Board Annual Meeting, January 2021.

Choi, **Seongjin**, Yeo, Hwasoo, Kim, Jiwon (2020). *Incorporating Network Traffic State for Urban Vehicle Trajectory Prediction*. The 99th Transportation Research Board Annual Meeting, January 2020.

Choi, **Seongjin**, Kim, Jiwon, Yu, Hwapyeong, Yeo, Hwasoo (2019). *Real-time Prediction of Arterial Vehicle Trajectories: An Application to Predictive Route Guidance for an Emergency Vehicle*. 2019 IEEE Intelligent Transportation Systems Conference (ITSC), October 2019.

Kim, Yeeun, **Choi**, **Seongjin**, Park, Jihyuk, Yeo, Hwasoo (2019b). *Agent-based Mesoscopic Urban Traffic Simulation based on Multi-lane Cell Transmission Model*. The 10th International Conference on Ambient Systems, Networks and Technologies, Acadia University, May 2019.

Choi, **Seongjin**, Kim, Jiwon, Yeo, Hwasoo (2019b). *Attention-based Recurrent Neural Network for Urban Vehicle Trajectory Prediction*. The 10th International Conference on Ambient Systems, Networks and Technologies, Acadia University, May 2019.

Lee, Donghoun, Tak, Sehyun, **Choi**, **Seongjin**, Yeo, Hwasoo (2019b). *Development of risk predictive collision avoidance system and its impact on traffic and vehicular safety*. The 98th Transportation Research Board Annual Meeting, January 2019.

Kim, Yeeun, **Choi**, **Seongjin**, Yeo, Hwasoo (2018). *Incorporation of Driver Distraction in Car-following model based on Driver's Eye Glance Behavior*. 2018 21st International Conference on Intelligent Transportation Systems (ITSC), October 2018.

Choi, **Seongjin**, Yeo, Hwasoo, Kim, Jiwon (2018b). *Network-wide Vehicle Trajectory Prediction in Urban Traffic Networks Using Deep Learning*. The 97th Transportation Research Board Annual Meeting, January 2018.

Choi, **Seongjin**, Tak, Sehyun, Kim, Jihu, Yeo, Hwasoo (2017). *Traffic Event Classification using Convolutional Neural Network*. The 30th KKHTCNN Symposium on Civil Engineering, November 2017.

Tak, Sehyun, Yeo, Hwasoo, Kim, Yeeun, **Choi**, **Seongjin** (2017). *A Study on the Dynamics of Driver Vision Transitions and its Impacts on Vehicle Safety*. 10th SHRP 2 Safety Data-Symposium: From Analysis to Results, October 2017.

Tak, Sehyun, Lee, Donghoun, **Choi**, **Seongjin**, Yeo, Hwasoo (2017). *Collision Avoidance System with Uni-directional Communication for Mitigating the Adverse Effects on Following Vehicles*. Urban Transport 2017, September 2017.

Choi, **Seongjin**, Yeo, Hwasoo (2017). *Framework for simulation-based lane change control for autonomous vehicles*. IEEE Intelligent Vehicles Symposium (IV), June 2017.

Tak, Sehyun, **Choi**, **Seongjin**, Lee, Donghoun, Yeo, Hwasoo (2017). *A Comparison Analysis of Track-Based Train Operation System and Communication-Based Train Operation System for Train Safety*. The 96th Transportation Research Board Annual Meeting, January 2017.

Tak, Sehyun, **Choi**, **Seongjin**, Yeo, Hwasoo (2016). *The Effect of Communication and GPS Uncertainty on Safety Performance of Communication-based Train Control*. The 1st Asian Conference on Railway Infrastructure and Transportation, October 2016.

Choi, **Seongjin**, Suh, Jonghae, Yeo, Hwasoo (2016). *Microscopic Analysis of Climbing Lane Performance at Freeway Uphill Section*. 2016 International Symposium of Transport Simulation, June 2016.

— Korean Domestic Journal

Choi, **Seongjin**, Kim, Jiwon, Yu, Hwapyeong, Ka, Dongho, Yeo, Hwasoo (2019). "Deep-learning based urban vehicle trajectory prediction". In: *Journal of Korean Society of Transportation* 37.5, pp. 422–429.

Kim, Yeeun, **Choi**, **Seongjin**, Yeo, Hwasoo (2019). "A study on development of a car-following model for accident simulation caused by driver distraction". In: *Journal of Korean Society of Transportation* 37.1, pp. 39–50.

Suh, Jonghae, **Choi**, **Seongjin**, Yeo, Hwasoo (2018). "A Study on Climbing Lane in Freeway Uphill Segment by Developing a Microscopic Traffic Simulation Model". In: *Journal of Korean Society of Transportation* 36.4, pp. 263–273.

Invited Talks

- **UC Berkeley PATH seminar**
  Berkeley (virtual) *2025.11.18*
- **Transportation Research in the Era of Generative AI** NCITE/CTS Symposium
  Minneapolis, MN *2025.10.10*
- **Deep Generative Models for Transportation and Mobility Data** Virginia Tech
  Virtual *2025.03.24*
- **I-24 MOTION workshop**
  A Gentle Introduction and Tutorial on Deep Generative Models in Transportation Research
  Washington, D.C. *2025.01.08*
- **2024 Future-Shaping ACE Congress**
  Traffic Forecasting with Correlated Spatiotemporal Structure Korea University

Virtual *2024.10.28*

- **Leveraging Spatiotemporally Correlated Structure for Deep-Learning-based Traffic Forecasting** Kookmin University
  Seoul, South Korea *2024.06.28*
- **Deep Generative Models for Transportation and Mobility Data** Seoul National University
  Seoul, South Korea *2024.06.18*
- **The 2nd Cho Chun Shik Graduate School of Mobility Summer Camp**
  Deep Generative Models for Transportation and Mobility Data — Intro & Tutorial KAIST
  Jeju, South Korea *2024.06.21*
- **Warren Distinguished Lecture**
  Understanding Distributions of Traffic and Mobility Data University of Minnesota
  Minneapolis, MN, USA *2024.02.23*
- **NSF-IRES**
  Leveraging Spatiotemporally Correlated Structure for Deep-Learning-based Traffic Forecasting Texas A&M
  Virtual *2024.02.01*
- **Deep Generative Models Tutorial** KAIST
  Virtual *2023.11.02*
- **Deep Generative Models for Mobility Trajectory Data** Western University
  London, Canada *2023.08.02*
- **Learning the Distribution of Traffic and Mobility Data** KAIST
  Daejeon, South Korea *2023.05.31*
- **Learning the Distribution of Traffic and Mobility Data** Seoul National University
  Seoul, South Korea *2023.05.23*
- **2022 Future-Shaping ACE Congress**
  Deep Generative Models for Transportation and Mobility Data Korea University
  Virtual *2022.11.21*
- **Trending Research Topics in AI and Potential Applications in Transportation Domain: (Part 2) Representation Learning** Korea Transport Institute
  Virtual *2022.11.01*
- **Trending Research Topics in AI and Potential Applications in Transportation Domain: (Part 1) Deep Generative Models** Korea Transport Institute
  Virtual *2022.09.27*
- **Modeling Behaviors of Road Users by Imitation Learning** Korean Society of Road Engineers
  Seoul, South Korea *2021.11.19*

Awards & Scholarships

- **TRANSFOR22 Data Competition - 3rd place** Award
  TRB AED50 Artificial Intelligence and Advanced Computing Applications *2022*
- **BK21 PLUS (Brain Korea 21 PLUS) Long-term Overseas Training Program (University of Queensland)** Scholarship
  Korea Advanced Institute of Science and Technology *2017*
- **National Scholarship (Fully-Funded Doctoral Course)** Scholarship
  Korea Advanced Institute of Science and Technology *2017-2021*
- **Railroad Specialized Graduate School Scholarship** Scholarship
  Ministry of Land, Infrastructure, and Transport in Republic of Korea *2015-2017*
- **National Scholarship (Fully-Funded Master Course)** Scholarship
  Korea Advanced Institute of Science and Technology *2015-2017*
- **National Scholarship (Fully-Funded Bachelor Course)** Scholarship
  Korea Advanced Institute of Science and Technology *2011-2015*

Patents (Domestic in Korea)

- **10-22795860000: Server and Method for Managing Shared Autonomous Vehicles**
  A management method for shared autonomous vehicles. This method proposes a demand-predictive management system for shared autonomous vehicles. It covers from the prediction algorithm and server framework to handle real-time data to predict the demand hot-spots to the route planning algorithm based on Artificial Intelligence.
- **10-2018-0141857: Traffic Simulator for Evaluation of ITS systems**
  A hybrid traffic simulator that can simulate the urban traffic networks in both mesoscopic and microscopic scales. This simulator uses distributed computing to simulate multiple scenarios in small amount of time, and aims to be applied to many applications such as route optimization of shared autonomous vehicles and signal control based on reinforcement learning.

Programming Skills

- **Programming Languages**: Python, R, C++, Julia
- **Deep learning**: Pytorch, Tensorflow
- **Other skills**: Microsoft Azure, Docker, QGIS