

Eunhan Ka

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RESEARCH INTERESTS

Network Modeling: Developing the solution techniques required to improve the efficiency and resilience of transportation networks, such as such as public transit, infrastructure, and logistics in uncertain and unpredictable conditions

Mobility Service: Developing the real-time operation strategy of mobility services (such as car-sharing, bike-sharing, and ride-sharing) in uncertain and dynamic conditions

Users' Behaviors: Identifying the characteristics of transportation users' behaviors (such as mode choice, shortest path algorithm, and driving behavior)

EDUCATION

Purdue University **Aug. 2020 - Present**

Doctor of Philosophy (Ph.D), Lyles School of Civil Engineering

Seoul National University **Feb. 2018**

Master of Science (M.S), Department of Civil and Environmental Engineering

Seoul National University **Feb. 2016**

Bachelor of Science (B.S), Department of Civil and Environmental Engineering

RESEARCH EXPERIENCE

Research Assistant **Aug. 2020 - Present**

Lyles School of Civil Engineering, Purdue University

- Design optimal strategies of COVID-19 vaccine distribution using demand forecasting and optimization

Researcher **Jan. 2020 - Aug. 2020**

Institute of Engineering Research, Seoul National University

- Lead a study on designing a cluster-based route of multi-capacity vehicles of a demand responsive transport service for the disabled and analyze the quantitative effects of shared parking services & last-mile mobility services
- Contribute to the preparation grant proposals for government-funded research projects

Researcher **Mar. 2018 - Dec. 2019**

Institute of Construction and Environmental Engineering, Seoul National University

- Develop optimal operation strategies of Mobility-as-a-Service (MaaS) for the mobility impaired (such as disabled or elderly people)
- Collaborate and coordinate with faculty members, businessmen, researchers, and fellow graduate students across institutes to develop proposals (University of Seoul, Radius Corporation, Korea Land & Housing Institute)

Research Assistant**Mar. 2016 - Feb. 2018***Department of Civil and Environmental Engineering, Seoul National University*

- Designed a real-time relocation strategy for one-way car-sharing and developed an event-based simulation for one-way car-sharing services
- Led a study on improving demand responsive transport service for the disabled with shared mobility in Seoul and led a study on developing an evaluation method to evaluate drivers' behaviors with surrogate safety measures
- Collaborated and coordinated with faculty, businessmen, and researchers at the Korea Transport Institute, Korea Transportation Safety Authority, InnoSim

TEACHING AND MENTORING EXPERIENCE

Lecturer, Introduction to Civil and Environmental Engineering**Nov. 2019***Department of Civil and Environmental Engineering, Seoul National University*

- Taught transportation engineering and trends of mobility services to 50 undergraduate students
- Covered areas of transportation engineering, status and issues of transportation in South Korea, future sustainable transportation systems, and transportation laws in South Korea

Mentor, Youth Engineering Frontier Camp**Aug. 2017, Feb. 2018***College of Engineering, Seoul National University*

- Taught traffic engineering and the basic theory of traffic flow to 10 high school students
- Advised students concerning preparing for admission to universities and consulted with the students about the difficulties they encountered in high school

Teaching Assistant (Professor Chungwon Lee)**Sep. 2016 - Dec. 2017***Department of Civil and Environmental Engineering, Seoul National University*

- Courses: Sustainable Transportation Systems (457.316A, 30 students) (Fall 2017; Undergraduate)
Advanced Transportation Operation (457.524A, 10 students) (Spring 2017; Graduate)
Leadership for Civil Engineers (457.104, 6 students) (Spring 2017; Undergraduate)
Transportation Engineering (457.208, 69 students) (Fall 2016; Undergraduate)
- Assisted in preparing and teaching course material for core subjects of transportation in undergraduate and graduate program, had office hours every week, answered questions in person, and marked assignments & exams
- Supervised undergraduate student's projects in terms of analyzing smart-card data, implementing clustering algorithms, and visualizing GPS data

PUBLICATIONS

Refereed Journal Publications

2. Eunhan Ka, Do-Gyeong Kim, Jooneui Hong, Chungwon Lee (2020), "Implementing Surrogate Safety Measures in Driving Simulator and Evaluating the Safety Effects of Simulator-Based Training on Risky Driving Behaviors", *Journal of Advanced Transportation*, vol. 2020, Article ID 7525721, 12 pages. <https://doi.org/10.1155/2020/7525721>
1. Dongmin Lee, Sooncheon Hwang, Eunhan Ka, Chungwon Lee (2018), "Evaluation of the Rain Effects on Gap Acceptance Behavior at Roundabouts by a Logit Model", *Journal of Advanced Transportation*, vol. 2018, Article ID 2726732, 11 pages. <https://doi.org/10.1155/2018/2726732>

Refereed Conference Proceedings

9. Ka, E., Ka, D., Jung, Y., and Lee, C (2020). A Cluster-Based Route Design of Multi-Capacity Vehicle in Large-Scale Demand Responsive Transport Service for the Disabled. 99th Annual Meeting of the Transportation Research Board, Washington DC, United States.

8. **Ka, E.**, Hong, D., Na, Y., and Lee, C. (2018) Analysis of Status in DRT Service for the Disabled in Seoul and Comparison Domestic and Foreign Cases. International Conference for Road Engineers, Jeju, South Korea.
7. Hong, D., **Ka, E.**, Ha, S., and Lee, C. (2018) Selection of Appropriate Hyperparameter for Waiting Time Prediction Model for Demand Responsive Transport for the Disabled in Seoul Using Long Short-Term Memory (LSTM) Network. The 78th Korean Society of Transportation Conference, Wonju, South Korea.
6. **Ka, E.**, Ha, S., Hong, J., and Lee, C. (2017) Application of Deep Learning for Demand Forecasting of Call Taxi for the Handicapped in Seoul. The 77th Korean Society of Transportation Conference, Seoul, South Korea.
5. **Ka, E.**, Kim, S., Hong, J., and Lee, C. (2017) A Preliminary Study of Comparison with Lane Changing Model Parameters in Merging Area between Normal and Raining Conditions. The 12th International Conference of Eastern Asia's Society for Transportation Studies (EASTS), Ho Chi Minh, Vietnam.
4. **Ka, E.**, Woo, D., and Lee, C. (2016) The Importance of Demand Prediction for Vehicle Relocation Strategy Development in One-way Car-Sharing System. The Third International Conference on Computational Science and Engineering, Ho Chi Minh, Vietnam.
3. **Ka, E.**, Kim, S., Woo, D., and Lee, C. (2016) An Estimation of Critical Gap for Gap Acceptance Model Applied to Lane Change of Surrounding Vehicles in Driving Simulator. 2016 Fall Korea Institute of ITS Conference, Busan, South Korea.
2. **Ka, E.**, Lee, S., Lee, J., and Lee, C. (2016) Comparison of Survival Model of Traffic Flow Deterioration due to Traffic Accident according to VDS Aggregation Level. The 75th Korean Society of Transportation Conference, Busan, South Korea.
1. Lee, S., Lee, H., Lee, J., **Ka, E.**, and Lee, C. (2016) Analysis of Traffic Flow Impacts of Highway Traffic Accidents Using Survival Analysis. The 74th Korean Society of Transportation Conference, Jeju, South Korea.

AWARDS AND HONORS

Outstanding Paper Award

Mar. 10, 2018

The 78th Conference of Korean Society of Transportation, Korean Society of Transportation

Lecture & Research Scholarship

Amount: \$ 4,500 (150% of tuition)

Sep. 2016 - Feb. 2017

Department of Civil and Environmental Engineering, Seoul National University

Brain Korea 21 Plus Scholarship

Amount: \$ 2,400

Mar. 2016 - Aug. 2016

National Research Foundation of Korea

Need-based Scholarship

Amount: \$ 300 (10% of tuition)

Mar. 01, 2016

Department of Civil and Environmental Engineering, Seoul National University

Outstanding Paper Award

Feb. 19, 2016

The 74th Conference of Korean Society of Transportation, Korean Society of Transportation

Alumni Association Scholarship

Amount: \$ 3,000 (100% of tuition)

Oct. 25, 2015

Alumni Association of Department of Civil Engineering, Seoul National University

Bronze Award

June 17, 2013

The 6th Science and Technology Writing Excellent Research Paper Presentation Competition, College of Engineering, Seoul National University

EXTRACURRICULAR ACTIVITIES

Leader of a Christian Club on Campus

Mar. 2016 - Feb. 2017

Mar. 2009 - Feb. 2011

- Organized and participated in various activities such as welcoming parties, weekly meetings, and voluntary trips
- Helped freshmen and exchange students adjust to the culture and life on a Korean campus

Leader of a Voluntary Campus Team with NGO**Jan. 2012**

- Recruited participants for voluntary activities and organized various activities, such as events to encourage the local staff, and teaching mathematics for local high school students
- Conducted geological exploration to locate groundwater and dug a well to address water shortages in Tanzania

Sergeant, Army of the Republic of Korea**Feb. 2014 - Nov. 2015**

- Served as a driver for a senior official in South Korea's Ministry of National Defense

SKILLS

Programming

- **R**; executing time-series analysis, clustering, data visualization, discrete choice modeling, and statistical analysis
- **Java**; developed agent-based simulation (demand responsive transport services) as well as event-based simulation (one-way car-sharing services); implemented mathematical models using the API of CPLEX
- **Python**; Implemented a Density-Based Spatial Clustering of Applications with Noise (DBSCAN) applicable to the paths of vehicles and a Long Short-Term Memory (LSTM) network using the API of the TensorFlow library

Software; CPLEX, SPSS, NLOGIT, VISSIM, LaTeX, Windows, Linux (Ubuntu), and Mac OS