LOUIS SUNGWOO CHO

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RESEARCH INTERESTS

Autonomous Mobility	Digital Twin Modeling	Traffic Flow Control
Intelligent Transportation Systems (ITS)	Reinforcement Learning	Transit Systems Optimization

EDUCATION

University of Illinois at Urbana–Champaign Aug 2020 – May 2025
M.S. in Civil Engineering (Transportation), GPA: 3.46/4.00
Labs: Smart City Laboratory
Thesis: *Evaluating Longitudinal Control Strategies for Autonomous Vehicles*
Advisor: Prof. Alireza Talebpour

B.S. (Honors) in Civil Engineering (Transportation), GPA: 3.55/4.00
Minor in Computer Science
Labs: Smart City Laboratory; Reliable Autonomy Group

EXPERIENCE

Graduate Research Assistant, Smart City Laboratory, UIUC Jul 2024 – May 2025

- Calibrated **control spacing models** for autonomous vehicles using a **genetic algorithm** to optimize performance across varied traffic scenarios; demonstrated that parameters must **adapt dynamically** to ensure stability.
- Conducted traffic flow stability analysis by simulating **heterogeneous (mixed autonomy)** and **homogeneous** traffic scenarios, demonstrating how the presence of autonomous vehicles mitigates stop-and-go shockwaves compared to fully human-driven flows.
- Deployed planning and control algorithms on a **physical autonomous vehicle** using **ROS**; analyzed real-time vehicle dynamics at the **Illinois Center for Transportation** to validate trajectory-tracking responsiveness.
- Performed **comparative behavioral analysis** using the Phoenix Robotaxi Open Dataset, examining lane-changing and car-following patterns of human versus autonomous drivers; conducted exploratory data analysis and trajectory visualizations to show behavioral differences.

Undergraduate Research Assistant, Smart City Laboratory, UIUC May 2023 – May 2024

- Developed a **trajectory re-identification** pipeline incorporating **LSTM-based Convolutional Social Pooling**, improving vehicle detection accuracy in low-visibility scenarios.
- Explored integration of **GPT-based sequence modeling** with **Deep Reinforcement Learning** for vehicle state prediction, evaluating feasibility for mixed autonomy traffic simulations.

Undergraduate Research Assistant, Reliable Autonomy Group, UIUC May 2022 – Aug 2022

– Co-developed **AutoVerse-AI**, a simulation platform for **control verification** of autonomous vehicles, controller safety and performance under various scenarios (github.com/AutoVerse-ai/Verse-library).

PUBLICATIONS & MANUSCRIPTS

– Cho, L. S., & Talebpour, A. (2025). *Evaluating Control Spacing Strategies for Autonomous Vehicles*. Under review in the ASCE Journal of Transportation Engineering, Part A: Systems, August 2025.

LEADERSHIP & SERVICE

Institute of Transportation Engineers (ITE), UIUC Chapter

President Aug 2022 – May 2024

– Led professional development by organizing seminars and panels with industry leaders in **CAVs** and **ITS**; increased student participation by **60%** and built partnerships with national ITE chapters, and volunteered at major transportation conferences.

– Directed a **transit analytics** project (ML-based bus ridership trends), identified capacity gaps, and presented at the *UIUC Engineering Open House*; earned **Top 3 Award** out of 200+ projects.

– Coordinated K–12 robotics outreach and networking events with UIUC engineering leadership.

Graduate Student Representative May 2024 – May 2025

– Organized graduate-level panels on transportation research and career development.

– Facilitated collaboration between undergraduate and graduate members, strengthening mentorship and project integration.

– Contributed to a chapter-wide case study and feasibility analysis on **High-Speed Rail (HSR)** development from Chicago to St. Louis.

Representative to the Engineering Council Sept 2023 – Apr 2024

– Advocated for the importance of **diversity in transportation** in the school community by building cross-disciplinary connections with representatives from other student organizations.

– Participated in **university community volunteering activities**.

SELECTED PROJECTS

GRAIC Autonomous Driving Competition Mar 2025 – May 2025

– Collaborated in a team to design and test autonomous driving algorithms; implemented and compared **RRT**, **Potential Field Steering**, and **End-to-End ML models** for obstacle avoidance and performance evaluation in simulation USING CARLA, ROS, and GAZEBO.

Sustainable Road Network Design Oct 2024 – Dec 2024

– Designed an optimization-based framework for **sustainable roadway improvements**, balancing traffic efficiency, construction costs, and environmental impact reduction through **Python-based modeling**.

Bus Rapid Transit (BRT) Feasibility Study, Champaign–Urbana Jan 2023 – Mar 2023

– Conducted a feasibility analysis of a BRT system; applied **mathematical optimization models** and **Python programming** to identify optimal stops and improve accessibility.

AWARDS & RECOGNITIONS

Charles E. DeLeuw Scholarship Mar 2025
Awarded to outstanding civil engineering students to study urban transit systems abroad. Conducted a field study in South Korea, analyzing the public transit network and producing a report on lessons applicable to U.S. transit planning.

UIUC Engineering Open House Outstanding Exhibit Award, 3rd Place Apr 2024
Recognition for a mobility exhibit covering **High-speed Rail**, **Maglev**, **eVTOL**, **BRT**, and **AI-driven** time-series forecasting for transit planning.

Grant W. Shaw Memorial Scholarship Mar 2023
Faculty-selected award recognizing **Leadership in Traffic Engineering** (UIUC Transportation area; Schaumburg Chapter, Illinois Association of Highway Engineers).

SKILLS

Programming: Python, Java, C++, HTML/CSS/JavaScript, ReactJS
Transportation/Simulation: ROS, CARLA, Gazebo, HCS
Design/Tools: Git, Cloud, Docker, LaTeX, Bentley Openroads, AutoCAD, Revit
Languages: English, Korean