

## YUNCHANG ZHANG

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48 Faber Walk  
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### PERSONAL WEBSITES

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Personal Webpage: <https://yzhang-genghis.github.io/>

Google Scholar: <https://scholar.google.com/citations?user=AHXbIzcAAAAJ&hl=zh-CN>

LinkedIn: <https://www.linkedin.com/in/yunchang-zhang-9758b2167/>

GitHub: <https://github.com/YZhang-Genghis>

### EDUCATION

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**Purdue University**, West Lafayette, IN

Ph.D. in Civil Engineering

May 2019 – May 2022

Dissertation Title: *“Making Crosswalks Smarter: Using Sensors and Learning Algorithms to Safeguard Heterogeneous Road Users”*.

Advisor: Dr. Jon D. Fricker

**Purdue University**, West Lafayette, IN

M.S. in Civil Engineering

August 2017 – May 2019

Thesis Title: *“Pedestrian-Vehicle Interactions at Semi-Controlled Crosswalks: Explanatory Metrics and Models”*.

Advisor: Dr. Jon D. Fricker

**Jilin University**, Jilin Province, China

B.S. in Traffic Engineering

September 2013 – July 2017

Thesis Title: *“Operational and Safety Impacts of U-Turn Median Openings on Multi-Lane Arterial Traffic”*.

Advisor: Dr. Dexin Yu

### RESEARCH INTERESTS

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#### Artificial Intelligence in Autonomous Driving

- Leveraging LiDAR intensity to evaluate and optimize the quality of high-definition map (HD Map) in the localization module.
- Developing computationally efficient motion forecasting algorithms using high-definition map and sensor fusion data in the navigation module.
- Investigating transfer learning techniques to improve generalization of motion forecasting algorithms in Singapore driving environments.

#### Data-Driven Platform for Transportation Performance Measures

- Connected vehicle centric dashboards for Interstate Traffic Management Systems (TMS) of the Future.
  - Monitored interstate operational performances with the fusion of connected vehicle data and High-Resolution Rapid Refresh data.
  - Developed a surrogate safety measure (hard-braking events) at interstates in Indiana using connected vehicle data.

- Utilizing sensors and learning algorithms to safeguard heterogeneous road users in shared spaces.
  - Extracted road user trajectory data from Miovision cameras mounted at intersections using computer vision algorithms.
  - Proposed novel surrogate measures of safety at uncontrolled intersections.
  - Developed deep learning algorithms to analyze the interaction behavior of heterogeneous road users and optimize signal timing at intersections.

## RESEARCH & WORK EXPERIENCE

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### Desay SV, Singapore

August 2022 – Present

*Senior Algorithm Engineer*

- Leveraged LiDAR intensity to evaluate and optimize the quality of HD-Map. Demo & URL: [http://10.219.127.33/Genghis\\_Zhang/lanegcn](http://10.219.127.33/Genghis_Zhang/lanegcn).
- Developed vehicle motion prediction algorithms using HD-Map features and sensor fusion data. Demo & URL: [http://10.219.127.33/Genghis\\_Zhang/lanegcn](http://10.219.127.33/Genghis_Zhang/lanegcn).
- Developed pedestrian motion prediction algorithms using HD-Map features and sensor fusion data. Demo & URL: <https://github.com/YZhang-Genghis/Social-LSTM>.

### Purdue University

*Post-Doctoral Research Fellow*

May 2022 – August 2022

- Development of a centralized processing center for UAS-based crash scene mapping. URL: <https://doi.org/10.3390/drones6090259>.
- Leveraging connected vehicle data to observe and analyze operational and safety performances of interstates. URL: <https://civl1122its01.ecn.purdue.edu/heatmap3f/2022-12-15/2022-12-16/I-465/0/53>

*Graduate Research Assistant, Dept. of Civil Engineering*

August 2017 – March 2022

- Developing surrogate measures of safety at uncontrolled intersections considering the interaction between heterogeneous road users. URL: <https://doi.org/10.1016/j.aap.2021.106254>.
- Predicting road user behavior using large-scale spatial-temporal trajectory data extracted from on-site cameras. URL: <https://github.com/YZhang-Genghis/XwalkTrajectory>.
- Implementing smart traffic signal control strategies in urban transportation networks. URL: <https://github.com/YZhang-Genghis/deep-reinforcement-learning-pedestrian-signal-design>.

## PUBLICATIONS

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- Fricker, J. D., & **Zhang, Y.** (2019). Modeling pedestrian and motorist interaction at semi-controlled crosswalks: the effects of a change from one-way to two-way street operation. *Transportation research record*, 2673(11), 433-446.
- Zhang, Y.**, Qiao, Y., & Fricker, J. D. (2020). Investigating Pedestrian Waiting Time at Semi-Controlled Crossing Locations: Application of Multi-State Models for Recurrent Events Analysis. *Accident Analysis & Prevention*, 137, 105437.

- Zhang, Y., & Fricker, J. D. (2020).** Multi-State Semi-Markov Modeling of Recurrent Events: Estimating Driver Waiting Time at Semi-Controlled Crosswalks. *Analytic Methods in Accident Research*, 100131.
- Yabe, T., **Zhang, Y., & Ukkusuri, S. V. (2020).** Quantifying the economic impact of disasters on businesses using human mobility data: a Bayesian causal inference approach. *EPJ Data Science*, 9(1), 36.
- Zhang, Y., & Fricker, J. D. (2021).** Investigating temporal variations in pedestrian crossing behavior at semi-controlled crosswalks: A Bayesian multilevel modeling approach. *Transportation Research Part F: Traffic Psychology and Behaviour*, 76, 92-108.
- Zhang, Y., & Fricker, J. D. (2021).** Quantifying the impact of COVID-19 on non-motorized transportation: A Bayesian structural time series model. *Transport Policy*, 103, 11-20.
- Zhang, Y., & Fricker, J. D. (2021).** Incorporating conflict risks in pedestrian-motorist interactions: A game theoretical approach. *Accident Analysis & Prevention*, 159, 106254.
- Zhang, Y., Fricker, J. (2021).** “Investigating Smart Traffic Signal Controllers at Signalized Crosswalks: A Reinforcement Learning Approach”. *Accepted by IEEE Intelligent Transportation Systems Magazine*.
- Zhang, Y., Fricker, J. (2022).** “Forecasting the Motion and Behavior of Heterogenous Road Users at Crosswalks: A Spatial-Temporal Graph-Based LSTM Approach”.
- Zhang, Y., Fricker, J. (2022).** “CrosswalkTrajectory: A Large-scale Spatial-Temporal Trajectory Dataset for Heterogeneous Road Users Behavior Prediction”. *Pre-print*. URL: <https://github.com/YZhang-Genghis/XwalkTrajectory>.
- Desai, J., Mathew, J. K., **Zhang, Y.,** Hainje, R., Horton, D., Hasheminasab, S. M., ... & Bullock, D. M. (2022). Assessment of Indiana unmanned aerial system crash scene mapping program. *Drones*, 6(9), 259.

## PRESENTATIONS

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- Yunchang Zhang** (2020). “A Semi-Markov Approach for Modeling Pedestrian Delay at Unsignalized Crosswalks”. *Transportation Research Board 99th Annual Meeting*, January 2020.
- Yunchang Zhang, Jon, D. Fricker** (2020). “Multi-State Semi-Markov Models: An Application to Drivers’ Gap Acceptance in front of Approaching Pedestrians at Unsignalized Crosswalks”. *Transportation Research Board 99th Annual Meeting*, January 2020.
- Jon, D. Fricker, **Yunchang Zhang** (2019) Modeling Pedestrian and Motorist Behavior at Semi-Controlled Crosswalks: The Effect of a Change from One-Way to Two-Way Street Operation. *Transportation Research Board 98th Annual Meeting*, January 2019.

## HONORS & AWARDS

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**Nellie Munson Teaching Assistant Award**  
*Dept. of Civil Engineering, Purdue University*

April 2021

**STV Civil Engineering Grad Assistantship Endowment**  
*Dept. of Civil Engineering, Purdue University*

September 2020

**STV Civil Engineering Grad Assistantship Endowment**

September 2018

*Dept. of Civil Engineering, Purdue University*

**ACTIVITIES & AFFILIATIONS**

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**Purdue Institute of Transportation Engineering (ITE)**

May 2019 – May 2020

*Event Coordinator, Dept. of Civil Engineering, Purdue University*

**Jilin University National Model United Nations Association**

September 2016 – June 2017

*Honorable Member, Jilin University, Changchun, China*

**SOFTWARE & SKILLS**

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**Programming Languages (from most to least experience):**

Python, C++, R, MATLAB, SQL, Stata