# Pei Li

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RESEARCH INTERESTS

Connected Vehicles, Traffic Safety, Big Data Analytics, Deep Learning

EDUCATION

**University of Central Florida**, Orlando, FL, USA

> Ph.D., Civil Engineering, August 2021
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> SAS Data Mining Certificate, May 2020
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> M.S., Smart Cities, May 2020

**Tongji University**, Shanghai, China

> M.Eng., Communication and Transportation Engineering, June 2018
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> B.Eng., Logistic Engineering, June 2015

**Coursera**, Mountain View, USA

> Getting Started with AWS Machine Learning, Sep 2020

RESEARCH EXPERIENCE

**University of Michigan**, Ann Arbor, MI, USA      August 2021 - Present
Postdoctoral Research Fellow

**University of Central Florida**, Orlando, FL, USA      August 2018 - August 2021
Graduate Research Assistant
*Crash Predictions for Expedited Detection*
- Processed over 2TB detector data to obtain traffic-related variables.
- Developed an ensemble tree-based model in Python for predicting secondary crash.
- Deployed the model in a real-time prototype to generate results for an interactive website.

*Connecting the East Orlando Communities Project-Phase I*
- Developed a deep learning model in Keras for predicting crash potential using connected vehicles emulated data.
- Implemented the model in a real-time prototype to generate results for a website.
- Developed a Bayesian negative binomial model in R for estimating crash frequency.

*Using Smartphone as On-board unit Emulator Implementation Study*
- Analyzed data of smartphone sensors (e.g., accelerometer, gyroscope, and GPS) from different drivers, vehicles, locations..
- Developed an LSTM model in Python to detect vehicle's maneuvers using smartphone sensors.
- Integrated the model into an Android application to protect the vulnerable road users.
- Validated the developed application under different conditions.

*Pre-Deployment Study for Connecting the East Orlando Communities Project*
- Evaluated safety and mobility at various segments and intersections with crash, traffic detector, and drone video data.

**Tongji University**, Shanghai, China      August 2015 - June 2018
Graduate Research Assistant
*Traffic External Costs Estimation for China*
- Estimated traffic external costs for China and compare with other countries.
- Provided policy suggestions to decrease external costs by expanding railway freight.

- Evaluated the proposed suggestions by discrete choice models.

PUBLICATIONS **Journals**

1. **Li, P.**, Abdel-Aty. M, 2021. Driving Behaviors Detection Using Semi-supervised LSTM and Smartphone Sensors, *Transportation Research Record*.

2. **Li, P.**, Abdel-Aty. M, and Yuan, J., 2020. Using Bus Driving Events as Surrogate Safety Measures for Pedestrian and Bicycle Based on GPS Trajectory Data, *Accident Analysis and Prevention*, 150.

3. **Li, P.**, Abdel-Aty, M., Cai, Q. and Islam, Z., 2020. A Deep Learning Approach to Detect Real-Time Vehicle Maneuvers Based on Smartphone Sensors. *IEEE Transactions on Intelligent Transportation Systems*.

4. Zhang, S., Abdel-Aty, M., Cai, Q., **Li, P.** and Ugan, J., 2020. Prediction of pedestrian-vehicle conflicts at signalized intersections based on long short-term memory neural network. *Accident Analysis and Prevention*, 148.

5. **Li, P.**, Abdel-Aty, M., Cai, Q. and Yuan, C., 2020. The Application of Novel Connected Vehicles Emulated Data on Real-Time Crash Potential Prediction for Arterials. *Accident Analysis and Prevention*, 144.

6. Zhang, S., Abdel-Aty, M., Yuan, J. and **Li, P.**, 2020. Prediction of pedestrian crossing intentions at intersections based on long short-term memory recurrent neural network, *Transportation Research Record*, 2674(4).

7. **Li, P.**, Abdel-Aty, M. and Yuan, J., 2020. Real-time crash risk prediction on arterials based on LSTM-CNN. *Accident Analysis and Prevention*, 135.

**Conferences**

1. **Li, P.**, Abdel-Aty, M. Trajectory Fusion-based Real-Time Crash Likelihood Prediction Using LSTM-CNN with Attention Mechanism, *Presentation at the 100th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2021.

2. **Li, P.**, Abdel-Aty, M. and Islam, Z, Driving Behavior Detection Using Semi-supervised LSTM and Smartphone Sensors, *Presentation at the 100th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2021.

3. **Li, P.**, Abdel-Aty, M. Using Bus Driving Events as Surrogate Safety Measures for Pedestrian and Bicycle Based on GPS Trajectory Data, *Presentation at the 100th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2021.

4. **Li, P.**, Abdel-Aty. M, Cai, Q, and Islam, Z, Real-time Vehicle Maneuvers Detection Based on Smartphone Sensors and Deep Learning, *Presentation at the 99th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2020.

5. Zhang. R, **Li, P.**, Calculation of External costs of Road and Railway Freight Transportation and Internalization, *Presentation at the 95th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2016.

HONORS AND AWARDS

- UCF College of Graduate Studies Presentation Fellowship, University of Central Florida   2020
- Stage III Winner in the USDOT's Solving for Safety Visualization Challenge, U.S. DOT   2019
- UCF College of Graduate Studies Presentation Fellowship, University of Central Florida   2019
- ORC Doctoral Fellowship, University of Central Florida   2018
- Best Undergraduate Thesis, Tongji University   2015

ACADEMIC SERVICE
- Reviewer, Accident Analysis and Prevention
- Reviewer, Traffic Injury Prevention
- Reviewer, Journal of Advanced Transportation
- Reviewer, Transportation Research Board
- Reviewer, Journal of Transportation Engineering, Part A: Systems
- Reviewer, PLOS ONE

SKILLS
- Programming: Python, R,
- Deep Learning Framework: TensorFlow, Keras, Pytorch
- Statistics: R, SAS
- Geographic Information System: QGIS, ArcGIS
- Database: SQL, PostgreSQL, MongoDB
- Traffic Simulation: SUMO, OMNeT++, Veins