Qing Chang, Ph.D., P.E., RSP

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EDUCATION

Ph.D. Transportation Engineering - Auburn University — Aug 2022

B.S. Civil Engineering - Auburn University — May 2017

SKILLS

Technical Skills: ITS Design, Traffic Operation and Simulation, Signal Design, Traffic Impact Study, Safety Analysis

Software: Synchro, PTV Vissim, Vistro, MicroStation, ArcGIS Pro, Sidra, TranSync, HCS, HSS, ProjectWise, Revu

Programming Languages: R, Visual Basic, Python, SQL

WORK EXPERIENCE

Project Engineer - Sain Associates, Inc. — **Aug 2022 – Present**

- Performed various types of traffic engineering related projects such as ITS design, traffic impact studies, traffic operation and simulation, traffic safety analysis/ studies, conceptual planning and design
- Presented technical findings to internal project teams, clients, and the public

Research Assistant - Auburn University — **May 2017 – Aug 2022**

- Conducted research related to traffic operation, access management, safety analysis and traffic simulations

SELECTED PROJECT EXPERIENCE (LEAD OR KEY MEMBER)

I-10 Mobile Revier Bridge Intelligence Transportation System (ITS) Design Build (Project Fund: $370,000)

May 2023 – Present

Kiewit Engineering

- Develop traffic management plans, ITS infrastructure (cabinets, pull box, fiber and electrical conduit) layouts, and device (camera, radar, DMS, BT, etc) deployment layouts for the I-10 interstate corridor, including high-level architecture for the Mobile River Bridge, Bay Way Bridge, and surrounding interchange terminals. This also includes designing emergency diverging strategies to enhance operational efficiency and safety
- Create special project details based on ITS design layouts (cabinet mounting details, splicing table, wiring schematics, network device port assignment, etc)
- Research and recommendation the state of art wrong way driving detection system and automated incident detection system

Alabama North Regional Traffic Operation (RTOP)

Nov 2023 – Dec 2024

Alabama Department of Transportation

- Develop, implement, and maintain traffic signal timing, clearance time calculation, sequencing, time-of-day schedules and coordination plans for 2 main arterial corridors and 25 intersections in City of Florence traffic signals using Synchro
- Validation and implementation of signal timing plan at various local controller cabinets (Eagle EPAC, Simens Serious, Cobalt Series, etc)
- Travel time monitoring and analysis for study corridors through ClearGuide

Tennessee State Strategic Highway Safety Plan (SHSP) 2025 – 2029 (Project Fund: $400,000)

Feb 2024 – Aug 2024

Tennessee Department of Transportation

- Identify Tennessee State's key safety needs through data driven method and develop investment decisions towards strategies and countermeasures with the highest potential to save lives and prevent injuries for the 2025 – 2029 period
- Perform statistical analyses with safety data (roadway, traffic, crash, and census data) to identify trends and factors that are more likely to result in crashes
- Identify emphasis areas, evaluate past performance, establish goals, develop performance measures, and compile the final SHSP report
- Present the new Strategic Highway Safety Plan (SHSP) at the Tennessee Highway Safety and Operations Conference, participate in SHSP quarterly meetings and develop evaluation process model to monitor action items progress

Kelly Creek Road Interchange Benefit-Cost Analysis — St. Clair County — Oct 2024 – Nov 2024

- Conduct benefit-cost analysis using USDOT Benefit-Cost Analysis Spreadsheet
- Utilize capacity analysis and traffic model to calculate travel time savings, vehicle operating cost savings, and emissions reductions for each alternatives
- Utilize results of the Highway Safety Manual's (HSM) Predictive Method to calculate safety benefits (crash reduction) for each alternatives

I-565/ SR-1 (Memorial Parkway) Interchange Pre-IMR Analysis — Barge Design Solutions — Aug 2024 – Present

- Obtain, review, and process supplied maps and traffic data. Obtain and process automatic traffic recorder station data from ALDOT
- Create Existing Conditions AM/PM Peak Microsimulation Model using PTV Vissim

Wrong-Way Driving Mitigation Plan for Tennessee Regions 3&4 (Project Fund: $400,000) — Tennessee Department of Transportation — Aug 2022 – Mar 2023

- Analyzed factors contributing to wrong way driving incidents in Tennessee Regions 3 and 4 and developed a model to prioritize improvement strategies
- Developed standard drawings for deployment of wrong-way related countermeasures
- Designed a wrong way driving prevention plan with recommendation drawings for each interchange terminal, incorporating solutions ranging from ITS technologies to low-cost countermeasures based on prioritized needs

Multiple Traffic Impact Studies (Project Fund: Varies) — Varies Clients — Aug 2022 – Present

- Perform multiple small to medium sized commercial/residential traffic impact studies
- Tasks include trip generation estimation, trip assignments, capacity analysis, signal warrants, turn lane warrants, access management, report writing, etc
- Develop operation alternatives using Synchro, sidra, and Vistro, such as AWSC, signal, roundabout, and RCUT.

Multiple TDOT Local Roads Safety Initiatives (Project Fund: Varies) — Tennessee Department of Transportation — Aug 2022 – Present

- Perform crash analysis on state-owned local roads to identify specific crash patterns
- Propose road safety improvement plans in accordance with MUTCD and the Greenbook. Conduct essential traffic analyses, including assessments for turn lane requirements and signal warrants.

NCHRP Project 03-135 Wrong Way Driving Solutions, Policy, and Guidance (Project Fund: $600,000) — May 2019 – Aug 2022 — National Cooperative Highway Research Program

- Examined crash data and evaluate how different roadway design elements affect the occurrence of wrong way driving by using multiple correspondence analysis
- Developed XGBoost models to predict the risk of wrong way driving on freeway based on different road design elements, Applied SHAP value to visualize the study results
- Created a safety diagnostic tool and prevention strategy for addressing wrong-way driving incidents based on Lasso-logistic regression
- Developed the first national wrong-way driving prevention handbook

Identify Communication Methods for Severely Intoxicated Drivers to Develop Effective Engineering Countermeasures for Wrong-Way Driving (Project Fund: $150,000) — Jun 2021 – Aug 2022 — California Department of Transportation

- Created driving simulator scenarios and utilized an eye-tracking system to monitor the behavior of intoxicated drivers, aiming to assess the efficiency of various countermeasures related to wrong-way driving through t-tests and ANOVA/Kruskal-Wallis tests

Development of Traffic Video Analysis Tool for Highway Safety Performance Evaluation (Project Fund: $150,000) — Apr 2021 – Aug 2022 — Alabama Department of Transportation

- Applied YOLO to detect the vehicles form regular traffic monitoring videos
- Performed vehicle tracking using the Deep SORT framework
- Analyzed vehicle trajectories and detect wrong-way driving events

Application of Advanced Simulation Tools for Optimizing Signal Timing for Local Transportation Agencies — Jan 2018 – Feb 2020

- Use advanced simulation tool (TranSync) to optimize and coordinate the signal timing plan for a corridor with 14 intersections in Montgomery, AL

Auburn University Highway Research Center

ALDOT Wrong-Way Training Program (Project Fund: $20,000) — Feb 2018 – Jul 2018

- Developed training booklet to introduce design guidance for preventing wrong way driving in geometric design and access management

Alabama Department of Transportation

HONORS & AWARDS

1st place of SDITE (South District Institute of Transportation Engineers) Young Member Technical Paper Competition	Mar 2021
Four years (2019 -2022) Walt and Virginia Woltosz Fellowship by Samuel Ginn College of Engineering, Auburn University	2019 - 2022
2019 GULF Region ITS Scholarships by the Gulf Region Intelligent Transportation Society (GRITS)	Sept 2019
Lifesavers Traffic Scholars (TSS) by Lifesavers Conference Traffic Safety Scholar Program	Dec 2018
Second Place Aware on oral presentation on 6th Annual UTC Conference for the Southeastern Region	Nov 2018
Research Assistant Scholarship by Department of Civil Engineering, Auburn University	2017 - 2022
Distinguished Leadership Award on 2019 MS/AL Annual Conference by the Alabama Chapter of the American Planning Association (ALAPA)	Oct 2018

PRESENTATIONS & PUBLICATIONS

A machine learning approach to quantify effects of geometric design features and traffic control devices on wrong-way driving incidents at partial cloverleaf interchange terminals Paper received for publication at Accident Analysis & Prevention	Jan 2025
Exploring the impact of design elements on wrong-way driving incidents at partial cloverleaf interchange terminals Paper received for publication at IATSS Research	Dec 2024
Examining Strategies, Polices, and Guidance for Addressing Wrong-Way Driving in the United States: A comprehensive National Survey. Paper received for publication at Journal of Safety Research	Sept 2024
Comprehensive analysis of trends, distribution, and odds of wrong-way driving fatal crashes on divided highways in the United States (2004 – 2020) Paper received for publication at Journal of Safety Research	May 2024
Assessing the Effectiveness of Traffic Control Devices in Deterring Wrong-Way Driving by Alcohol-Impaired Drivers: A Driving Simulator Study Paper received for publication at Journal of Safety Research	Sept 2019
Wrong-Way Driving Solutions, Policy, and Guidelines Technical Report Published at National Academies of Sciences, Engineering, and Medicine	Aug 2023
Wrong-Way Driving Solutions Handbook Book Published at National Academies of Sciences, Engineering, and Medicine	Aug 2023
Identifying wrong-way driving incidents from regular traffic videos using unsupervised trajectory-based method Paper received for publication at Transportation Research Record	Feb 2022
Multiple correspondence analysis of wrong-way driving fatal crashes on freeways Paper received for publication at Transportation Research Record	Oct 2021
Field Implementation and Evaluation of Low-Cost Countermeasures for Wrong-Way Driving Crashes in Alabama Technical Report Published at Auburn University. Highway Research Center	Dec 2020