

Kuan-Ting Chen

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EDUCATION

University at Buffalo, the State University of New York, USA June 2021

PhD, Industrial and Systems Engineering – Human Factors and Ergonomics

- Dissertation: Supporting driver's understanding of state of the automated driving system through continuous feedback.
- Advisor: Dr. Huei-Yen (Winnie) Chen

National Taiwan University, Taipei, Taiwan June 2012

Master of Science, Division of Transportation Engineering, Civil Engineering

- Thesis: Development of the Timetable Performance Evaluation System for Rail Transportation.

National Taiwan University, Taipei, Taiwan June 2010

Bachelor of Science, Civil Engineering

RESEARCH EXPERIENCE

Virginia Tech Transportation Institute, Blacksburg, VA, USA

Human Factors Transportation Researcher

Jan. 2023 – Present

Project: Development of On-road Driving Performance Evaluation Methods for ADS-equipped Heavy Vehicles

- Lead scenario development for scenario-based testing for safety.
- Collaborate on the definition of safety and performance evaluation metrics.

Center for Inclusive Design and Environmental Access, SUNY Buffalo, New York, USA

PI: Dr. Victor Paquet

Graduate Research Assistant

Sept. 2020 – May 2021

Project: Next Generation of Shared Autonomous Vehicles (SAVs)

- Collaborated on the development of study materials and IRB protocol.
- Set up virtual focus group and interview for understanding SAV design needs for people using wheeled mobility devices.
- Set up contextual inquiry study to understand design challenges for people using wheeled mobility devices during boarding, riding, and disembarking.

Applied Cognitive Engineering Lab, SUNY Buffalo, New York, USA

Lab Director: Dr. Winnie Chen

Graduate Research Assistant

Aug. 2017 – May 2021

Project: A study of the effectiveness of sonification feedback for highly automated driving

- Conducted literature review on driver take-over control behavior and auditory feedback design.
- Developed in-vehicle sonification feedback displays to support driver take-over behavior.

- Designed driving simulator experiment to evaluate the sonification feedback.

Project: Developing a fault tree framework for why driver takeover may fail in automated driving.

- Reviewed literature of takeover behavior and ODD taxonomy in automated driving.
- Developed takeover situation taxonomy for SAE level 2 and level 3 driving automation.
- Developed a fault tree framework for driver failure in takeover procedure.

TRB Student Paper Competition: Abstract selected for further analysis in SHRP 2 Safety Data Bonanza 2017–2018. Project: Using naturalistic driving data to examine the influences of driving styles on crash severity level

- Clustered individual driver into groups with associated driving styles based on time series data using RandomForest and PAM.
- Modeled the association between driving styles and crash severity level using Diagonal Inflated Bivariate Poisson Regression.

Project: Simulation-based human factors evaluation of navigational and safety impacts on infographics-based signage

- Co-designed driving simulator experiment scenario.
- Designed survey questionnaire to evaluate sign visibility based on participants' experience in a driving simulator study.

Cognitive System Lab, SUNY Buffalo, New York, USA

Lab Director: Dr. Sean Wu

Graduate Research Assistant

Aug. 2015 – Jan. 2017

- Conducted experiment understanding driver take over control behavior responding to audio and vibration warning under autonomous vehicle context using OpenDS driving simulator.
- Collected data in drinking and driving experiment using STISIM simulator.
- Performed regression analysis of heart rate data from smartwatch application after people consuming alcohol.

Railway Technology Research Center, National Taiwan University

National Taiwan University Frontier and Innovative Research Program

Aug.2010 – June2012

Project: Development of Timetable Stability and Efficiency Evaluation Model

PI: Dr. Yung-Cheng Lai

- Built an analytical model to assess railway service plan and its risk.
- Developed a Monte Carlo simulation framework to assess the uncertainty of railway service plan.
- Clustered railway accident data with k-means clustering algorithm.
- Applied the proposed analytical model and simulation model to real world service plans of a railway operation authority.

JOURNAL PUBLICATION

1. **Chen, K.T.**, Chen, H.-Y.W., Ann Bisantz, Su Shen, and Ercan Sahin (2023). Where Failures May Occur in Automated Driving: A Fault Tree Analysis Approach. *Journal of Cognitive Engineering and Decision Making*, 17(2), 147-165.
2. **Chen, K.T.**, Chen, H.-Y.W., and Ann Bisantz (2023). Adding Visual Contextual Information to Continuous Sonification Feedback About Low-reliability Situations in Conditionally Automated Driving: A Driving Simulator Study. *Transportation Research Part F: Traffic Psychology and Behaviour*, 94, 25-41.
3. **Chen, K.T.**, Chen, H.-Y.W. (2022). Modeling the Impact of Driving Styles on Crash Severity Level Using SHRP 2 Naturalistic Driving Data. *Safety*, 8(4), 74.
4. **Chen, K.T.**, Chen, H.-Y.W. (2021). Manipulating Music to Communicate Automation Reliability in Conditionally Automated Driving: A Driving Simulator Study. *International Journal of Human-Computer Studies*, 145, 102518.
5. **Chen, K.T.**, Chen, H.-Y.W. (2019). Driving Style Clustering Using Naturalistic Driving Data. *Transportation Research Record*, 0361198119845360.
6. Lai, Y. C., **Chen, K. T.**, Yan, T. H., and Li, M. H. (2018). Simulation-Based Method of Capacity Utilization Evaluation to Account for Uncertainty in Recovery Time, *Transportation Research Record*, 2672(10), 202-214.
7. Lai, Y. C., **Chen, K. T.** (2017). Evaluating Service Risk in Railway Capacity Utilization Using Expected Recovery Time, *ASCE Journal of Transportation Engineering, Part A: Systems*, 143(6): 04017016.

CONFERENCE PROCEEDINGS

1. **Chen, K.T.**, Sahin, E., Shen, S., Bisantz, A., and Chen, H.-Y.W. (2020, December). A Framework for Understanding Where Failures May Occur in Highly Automated Driving. *Proceedings of the Human Factors and Ergonomics Society 64th Annual Meeting*.
2. Lai, Y. C., Li, T. Y., Liu, M. C., and **Chen, K. T.**, Evaluation of Timetable Stability and Efficiency for Taiwan Railway Administration, *Proceedings of 2010 Conference and Annual Meeting of Chinese Institute of Transportation*, Taichung, Taiwan, 2010.

POSTERS AND PRESENTATIONS

1. "A Framework to Understand Where Failures May Occur in Highly Automated Driving." Presented at the HFES 64th International Annual Meeting, Oct. 2020, Virtual.
2. "Communicating Automation Reliability Through Music Quality: A Sonification Approach to Driver Feedback." Poster and Presentation at Transportation Research Board 98th annual meeting, Jan. 2019, Washington D.C.
3. "Driving Style Clustering Using Naturalistic Driving Data." Presentation at Transportation Research Board 98th annual meeting, Jan. 2019, Washington D.C.
4. "Using Naturalistic Driving Data to Examine the Influences of Driving Styles on Crash Severity Level." Special poster session at Transportation Research Board 98th annual meeting, Jan. 2019, Washington D.C.
5. "A Study of the Effectiveness of Sonification Feedback for Highly Automated Driving." Presented at the 18th Inter-University Workshop, Nov. 2017, Buffalo, NY.

6. "Evaluation of Railway Service Efficiency and Stability in Capacity Utilization", Presentation at 10th Eastern Asia Society for Transportation Studies (EASTS), Taipei, Taiwan, September, 2013.

NON-REFEREED PUBLICATIONS

1. Arnold, L.S., Benson, A., **Chen, K.T.**, Kelley-Baker, T. and Horrey, W. (2019). Detection Windows for Drugs in Oral Fluid: Cannabinoids, Stimulants, and Opioids. AAA Foundation for Traffic Safety.
2. Kim, W., Kelley-Baker, T. and **Chen, K.T.** (2019). Review of Current Practices for Setting Posted Speed Limits. AAA Foundation for Traffic Safety.

TEACHING EXPERIENCE

University at Buffalo, the State University of New York

Graduate Teaching Assistant – IE 436 Work Physiology Jan. 2017 – May 2017

- Created quiz and exam questions.
- Graded quizzes and exams.

Graduate Teaching Assistant – IE 409 Lean Sig Sigma Sep. 2016 – Dec. 2016

- Created quiz and exam questions.
- Graded quizzes and exams.

National Taiwan University

Graduate Teaching Assistant – Transportation System Feb. 2011 – June 2011

- Assisted in preparing lecture material.
- Graded homework, project, quizzes, and exams.

WORK EXPERIENCE

Virginia Tech Transportation Institute

Human Factors Transportation Researcher Jan. 2023 – Present

- Conduct and support human factors research work for heavy vehicle safety.

Locomotion, Inc

Human Factors Engineer May 2022 – Nov. 2022

- Supported human factors studies for the development of Autonomous Relay Convoy system for two-truck platooning operation.
- Supported Human-Machine Interface design and validation.

X Energy, LLC

Human-Machine Interface Engineer July 2021 – April 2022

- Collaborated and coordinated human factors activities for developing nuclear reactor control room human-machine interface.
- Collaborated on the development of Integrated Style Guide for Control human-machine interface design.

AAA Foundation for Traffic Safety

Summer Intern

May 2018 – Aug. 2018

- Collected information of speed limit design process and analyzed survey from practitioners to prepare research brief for the impact of speed limit change on traffic safety.
- Fatality Analysis Reporting System (FARS) data wrangling with R for Hit-and-Run study.
- Conducted Systematic review regarding the detection time of drug usage with oral fluid.

TÜV Rheinland Taiwan Ltd.

Rail Engineer

July 2013 – June 2015

- Performed Railway Rolling Stock Safety Critical Function Verification and Validation in TTY Mass Rapid Transit Project.
- Developed Reliability and Maintainability Demonstration Plan for Taiwan High Speed Rail New Station Electrical and Mechanical Equipment.
- Performed railway turnout Independent Verification and Validation in TRA Taichung and Yuanlin Section Rail Line Elevated Project.
- Inspected railway tracks for Philippine National Railways and compiled inspection report.

Mandatory Military Service

Second Lieutenant, Platoon Leader, Army, Taiwan ROC.

Aug. 2012 – July 2013

PROFESSIONAL SERVICES

Reviewer Activities

- Accident Analysis and Prevention, ACM SIGCHI AutoUI, Human Factors, Human Factors and Ergonomics Society (HFES) Annual Meeting, IEEE Transactions on Human-Machine Systems, Transportation Research Part F: Traffic Psychology and Behaviour, Transportation Research Record
- Primary Associate Chair for Paper Review 2020, 2023
International ACM Conference on Automotive User Interfaces

Affiliation

- Student Member, Human Factors and Ergonomics Society 2017 – 2021
- Student Member, Special Interest Group on Computer-Human Interaction 2018 – 2021

VOLUNTEER

- Social Media Co-chairs 2020
12th International ACM Conference on Automotive User Interfaces (Virtual).
- HFES Student Chapter at University at Buffalo - Vice President Feb. 2019 – Sep. 2019
University at Buffalo, Buffalo, NY.
- Workshop Fund-raising Chair June 2017 – Oct. 2017
Inter-University Workshop, Buffalo, NY.
- Student Volunteer Mar. 2017
AAUW Tech Savvy Program, Buffalo, NY.

AWARDS

Best Presentation Award

- AND00 hybrid session on performance of transportation users at the TRB 98th annual meeting. Jan. 2019

Student Paper Competition: SHRP 2 Safety Data Bonanza

- Abstracts selected for research and presentation at special poster session at the TRB 98th annual meeting. Study title: "Using Naturalistic Driving Data to Examine the Influences of Driving Styles on Crash Severity Level." Dec. 2017 – Jan. 2019

GSEU Professional Development Program – University at Buffalo

- Conference funding. July 2018

GSA student travel fund – University at Buffalo

- Conference funding . 2017, 2018, 2020