Nade Liang

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ACADEMIC POSITIONS

Assistant Professor (Incoming)   Lubbock, TX
Department of Industrial, Manufacturing, & Systems Engineering
Texas Tech University (TTU)   Fall 2024

Research Assistant   West Lafayette, IN
School of Industrial Engineering
Purdue University   2018 – 2023

Research Assistant   West Lafayette, IN
Lyles School of Civil Engineering
Purdue University   2022

EDUCATION

Purdue University   West Lafayette, IN
Ph.D., School of Industrial Engineering   May 2024
Dissertation: *Automation-To-Human Transition of Control: An Examination of Pre-Transition Behaviors That Influence Readiness to Take Over from Conditionally Automated Vehicles*
Advisor: Brandon Pitts

Purdue University   West Lafayette, IN
Graduate Certificate in Applied Statistics, Department of Statistics   May 2022

Purdue University   West Lafayette, IN
M.S.I.E., School of Industrial Engineering   August 2019
Thesis: *Assessing the Effects of Cognitive Secondary Task and Automation Type on Changes in Heart Rate: Implications for the Potential Use of Nanotechnology*
Advisor: Brandon Pitts

Beihang University   Beijing, China
B.Eng., School of Transportation Science and Engineering   June 2017
Senior Design: *Assessing Cockpit Seat Pressure Distribution and Comfort Using Finite Element Analysis (FEA)*

RESEARCH EXPERIENCE

Westat   Rockville, MD
Transportation Research Intern   June 2023 – August 2023
- Design and conducted on-road human subject experiments on an instrumented vehicle

- Perform human behavior data coding, cleaning and statistical analysis in R
- Evaluate the effectiveness of different human-machine interface for transferring system situation knowledge to driver
- Collaborate with research partners and researchers from NHTSA and UW Madison
- Contribute to writing response proposals to NHTSA Request for Proposal (RFP)
- Develop a computer-vision-based automatic driver eye glance coding program

Purdue University West Lafayette, IN
Graduate Research Assistant, School of Industrial Engineering August 2019 – May 2022
- Design and conduct human subject experiments on the NADS miniSim driving simulator
- Conduct a systematic literature review on physiological measurements of situation awareness
- Assess drivers' cognitive state using eye-tracking, electroencephalography (EEG), heart rate variability (HRV), and skin conductance metrics
- Evaluate the effects of driver behaviors during SAE Level 3 driving on takeover readiness
- Build physiological-measurement-based situation awareness machine learning prediction models
- Collaborate with industry partners and researchers from Ford Motor Company
- Evaluate older adult users' skill transfer in video conferencing platforms through online user interactions

Purdue University West Lafayette, IN
Graduate Research Assistant, Lyles School of Civil Engineering June 2022 – August 2022
- Conduct focus group studies to understand older adults' (65+) perception and needs of shared autonomous vehicles
- Perform quantitative analysis on video recordings, questionnaires, and qualitative meta-analysis on interview transcripts
- Lead four undergraduate research interns in human subject experiments and data analysis practices
- Present research findings and write technical reports to the industry sponsor management team

Purdue University West Lafayette, IN
Graduate Student Researcher, School of Industrial Engineering August 2018 – May 2019
- Evaluate the effect of cognitive workload on driving performance in semi-autonomous driving
- Use novel nanotechnology sensor in measuring heart rate and heart rate variability in predicting drivers' cognitive workload

PUBLICATIONS

[J1] **Liang, N.,** Yang, J., Yu, D., Prakah-Asante, K. O., Curry, R., Blommer, M., Swaminathan, R. & Pitts, B. J. (2021). Using eye-tracking to investigate the effects of pre-takeover visual engagement on situation awareness during automated driving. *Accident Analysis & Prevention*, 157, 106143.

[J2] Zhang, T., Yang, J., **Liang, N.,** Pitts, B. J., Prakah-Asante, K. O., Curry, R., Duerstock, B. S., Wachs, J. P. & Yu, D. (2020). Physiological measurements of situation awareness: a systematic review. *Human Factors*, 0018720820969071.

[J3] Yang, J., **Liang, N.,** Pitts, B.J., Prakah-Asante, K.O., Curry, R., Duerstock, B., Wachs, J. & Yu, D. (2023) An eye-fixation related electroencephalography (EEG) technique for predicting situation awareness: Implications for driver state monitoring systems. *Human Factors.*

[J4] Yang, J., **Liang, N.,** Pitts, B.J., Prakah-Asante, K.O., Curry, R., Duerstock, B., Wachs, J. & Yu, D (2023). Multi-modal Sensing and Computational Intelligence for Situation Awareness Classification in Autonomous Driving. *IEEE Transactions on Human-Machine Systems*.

[J5] (Under review) **Liang, N.,** Connaughton, S.L., Pitts, B.J. & Gkritza, K. Understanding Older Adults' Needs and Perceptions for Interior Features of Shared Automated Vehicles: A Focus Group Study. *Applied Ergonomics*.

[J6] (Under review) **Liang, N.,** Li, G., Werner, L. & Pitts, B.J. Does My Past Shape My Future? An Investigation into Whether Older Adults' New Task Performance on Videoconferencing Platforms Benefits from Their Prior Experiences. *Behaviour & Information Technology*.

[C1] **Liang, N.,** Lim, C., Yu, D., Prakah-Asante, K. O., & Pitts, B. J. (2023). Predicting Automated Vehicle Takeover Decisions During the Nighttime. Accepted in *Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 67).*

[C2] **Liang, N.,** Yang, J., Yu, D., Prakah-Asante, K. O., Curry, R., Blommer, M., Swaminathan, R. & Pitts, B. J. (2022). The Effects of Non-Driving-Related Task Engagement on Automated Driving Takeover Performance During the Nighttime. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 66).*

[C3] Yang, J., **Liang, N.,** Pitts, B. J., Yu, D. (2022). Assessment of Situation Awareness in Automated Driving Using Eye-fixation Related EEG Analysis. *Accepted in Proceedings of the Human Factors and Ergonomics Society Annual Meeting (Vol. 66).*

[C4] **Liang, N.,** Yang, J., Prakah-Asante, K. O., Curry, R., Blommer, M., Swaminathan, R. & Pitts, B. J. (2021, September). Look up! An eye-tracking study on situation awareness during automated vehicle takeover. *In Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 65, No. 1, pp. 1071-1071).

[C5] Yang, J., **Liang, N.,** Prakah-Asante, K. O., Curry, R., Blommer, M., Swaminathan, R. & Yu, D. (2021, September). Situation awareness classification using multi-modal sensing

in automated driving. *In Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 65, No. 1, pp. 52-52).

[C6] **Liang, N.,** & Pitts, B. J. (2019, November). The Effect of Secondary Cognitive Task Difficulty on Headway Maintenance and Perceived Workload While Using Lane Keeping Systems. *In Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 63, No. 1, pp. 2011-2015).

[C7] Huang, G., **Liang, N.,** Wu, C., & Pitts, B. J. (2019, November). The impact of mind wandering on signal detection, semi-autonomous driving performance, and physiological responses. *In Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 63, No. 1, pp. 2051-2055).

PUBLICATIONS IN EDIT

Liang, N., Lim, C., Pitts, B.J., Prakah-Asante, K.O., Curry, R., Duerstock, B., Wachs, J. & Yu, D. Assessing driver situation awareness in naturalistic Level-3 autonomous driving using eye-tracking and EEG.

Liang, N., Villareal, R., Yu, D., Nasir, M., & Pitts, B.J. Effects of cognitive task engagement on visual and motor readiness during non-urgent Level-3 autonomous driving takeover.

Liang, N., Wang, R., Wu, W, & Pitts, B.J. Variations in L2 automation: examining cognitive workload through heart rate variability.

PRESENTATIONS AND POSTERS

Liang, N. (presenter), Lim, C., Yu, D. & Pitts, B. J. (2023). Automated vehicle takeover performance: A pilot study on the combined effects of non-driving-related task engagement and environmental conditions. Oral presentation at the 2023 IISE Annual Conference & Expo. Seattle, New Orleans, LA. May.

Liang, N. (presenter), Krishna, A., Gkritza, K., Kozak, K. & Connaughton, S. (2023). Accessibility Needs in Shared Autonomous Vehicles (SAV) for Older Adult Riders: A Focus Group Study. Poster presentation at the 26th Applied Ergonomics Conference. New Orleans, LA. March.

Liang, N. (presenter), Lim, C., Yu, D. & Pitts, B. J. (2022). The Effects of Non-Driving-Related Task Engagement on Automated Driving Takeover Performance During the Nighttime. Oral presentation at the 66th International Annual Meeting of the Human Factors and Ergonomics Society. Atlanta, GA. October.

Liang, N. (presenter), Lim, C., Yu, D. & Pitts, B. J. (2022). Assessment of Situation Awareness in Automated Driving During Nighttime. Oral presentation at the 2022 IISE Annual Conference & Expo. Seattle, WA. May.

Liang, N. (presenter), Yang, J., Prakah-Asante, K. O., Curry, R., Blommer, M., Swaminathan, R. & Pitts, B. J. (2021). Look up! An eye-tracking study on situation awareness during automated vehicle takeover. Oral presentation at the 65th International Annual Meeting of the Human Factors and Ergonomics Society. Baltimore, MD. October.

Liang, N. (presenter), Luster, M. (2021). Uses of Eye-Tracking Measure in Driving Behavior Assessments. Oral presentation given at the ITE Purdue Research Brown Bags. West Lafayette, IN. August.

Liang, N. (presenter), Yang, J., Zhang, T., Pitts, B., & Yu, D. (2020). What Can Eye Tracking Reveal About Situation Awareness? A Systematic Review. Oral presentation at the 64th International Annual Meeting of the Human Factors and Ergonomics Society. Chicago, IL. (Virtual). October.

Liang, N. (co-presenter), Huang, G., & Pitts, B. J. (2020). Physiological Monitoring During Autonomous Driving. Oral presentation at the 106th Purdue Road School Transportation Conference and Expo. West Lafayette, IN. March.

Liang, N. (presenter), & Pitts, B. J. (2019). The Effect of Secondary Cognitive Task Difficulty on Headway Maintenance and Perceived Workload While Using Lane Keeping Systems. Oral presentation at the 63rd International Annual Meeting of the Human Factors and Ergonomics Society. Seattle, WA. October.

Liang, N. (presenter), & Pitts, B. J. (2019). The Effect of Cognitive Workload on Driving Performance and Perceived Workload. Oral presentation at the 1st Annual Conference on Next-Generation Transport Systems (NGTS-2019). West Lafayette, IN. May.

Liang, N. (presenter), Huang, G. & Pitts, B. J. (2019). Assisted-Driving & Autonomous Vehicle Systems: Human Factors Considerations in Next-Generation Transportation. Poster presented at the 105th Purdue Road School Transportation Conference and Expo. West Lafayette, IN. March.

GRANTS & AWARDS

National Highway Traffic Safety Administration RFPs – contributed via Westat	2023
• *Distraction: Modern voice command interfaces (Awarded)*	
First Place Presentation, Purdue Industrial Engineering Research Symposium	2023
• *Accessibility Needs in Shared Autonomous Vehicles (SAV) for Older Adult Riders: A Focus Group Study*	
Purdue University Graduate Student Travel Grant	2023
HFES Perception and Performance TG (PPTG) Student Research Grant	2021
HFES Augmented Cognition TG (ACTG) Honorable Mention on Student Research	2021
• *Title: Assessment and Prediction of Situation Awareness During Takeover in Semi-Autonomous Driving at Nighttime*	
HFES Surface Transportation TG (STTG) Best Paper Finalist	2022
Purdue University College of Engineering Conference Travel Grant	2022
HFES Student Member with Honors Award	2022
Lifesavers Traffic Safety Scholar	2022
Travel Grant, School of Industrial Engineering, Purdue University	2021
First Place, HFES National Ergonomics Month Contest	2021
Lee A. Chaden Fellowship in Industrial Engineering	2020
HFES Honor Student of Purdue Award	2020
Travel Grant, School of Industrial Engineering, Purdue University	2019

Student Presenter Award, 63rd HFES Annual Meeting	2019
First-year Graduate Student Award, 63rd HFES Annual Meeting	2019

MENTORING

Gen Li – Ph.D. Student at Purdue Industrial Engineering
Project 1: Evaluate the Effectiveness of Piezoelectric Nano-sensor in Measuring Cognitive Workload During SAE Level 1 Autonomous Driving 2022
Project 2: An Investigation into Whether Older Adults' New Task Performance on Videoconferencing Platforms Benefits from Their Prior Experiences 2023
Fah Yen – Undergraduate Research Assistant 2023
Project Name: Predicting Re-engagement Readiness Using In-vehicle Behavior and Physiological Measures
Alexander Clark –M.S.I.E. Student at Purdue Industrial Engineering 2023
Project Name: A Virtual Reality Based AV-Pedestrian Interaction Experience
Nnaemeka Onyekoro - Purdue University Summer Research Opportunities Program 2022
Project Name: Comparing Between Objective Driving Performance and Subjective Automated Assistance Preference
Justin S. Lee - Purdue Summer Undergraduate Research Fellowship (SURF) 2021
Project Name: Predicting Mental Workload During Semi-Autonomous Driving Using Physiological and Driving Performance Measures
Graduate Advisor at Center for Rehabilitation Engineering and Assistive Technology 2020 **(CREATe), Purdue University**
Guide undergraduate teams on product design and manufacturing during Virtual Hackathon @ Purdue on Accessible PPE
Alec J. Gonzales - Purdue Summer Undergraduate Research Fellowship (SURF) 2019
Augmented Reality in Semi-Autonomous Driving: The Effect of Warning Signal Format and Perceived Urgency on Takeover Performance.

SERVICE & LEADERSHIP

Professional Services
Journal Reviewer
- *Applied Ergonomics*
- *Accident Analysis & Prevention*
- *Ergonomics*
- *International Journal of Human-Computer Interaction*
- *IEEE Transactions on Affective Computing*

Conference Proceedings Reviewer 2019-Present
- *Human Factors and Ergonomics Society (HFES) Annual Meeting*

Program Chair, 2023-Present
- *HFES Perception and Performance Technical Group (PPTG)*

Electronic Communication Co-Chair, 2021-2023
- *HFES Perception and Performance Technical Group (PPTG)*

Session Co-Chair, 2022 IISE Annual Meeting & Expo 2022
- *Human Factors: Human-Vehicle Interaction*

Session Chair, HFES Annual Meetings 2021, 2023

- *Surface Transportation Technical Group (STTG)*

HFES Student Affairs Committee Student Liaison 2021-Present
Committee Chair, 1st Annual HFES Student Chapter Conference 2020 2020
Volunteer, HFES Fellows Task Force 2020
Session Co-Chair, 63rd HFES Annual Meeting 2019
- *Surface Transportation Technical Group (STTG)*

University-related Services
Lab Technical Manager, NHanCE Research Lab, Purdue University 2019-Present
Co-President, Human Factors & Ergonomics Society Purdue Student Chapter 2021-2022
- *Vice-President 2019-2020*
- *The chapter won Gold Student Chapter Award (2019-2022)*

Judge, Purdue Summer Undergraduate Research Fellowship Research Symposium 2019, 2021

Community Services
Tech Team Volunteer, Purdue Center on Aging and the Life Course (CALC) 2019-2022
- *Solving electronic equipment problems at senior living facilities*

Volunteer & Team Leader, Purdue Space Day 2018-2019
- *STEM education outreach program for K-12 students*

TEACHING EXPERIENCE

Teaching Assistant - Purdue University West Lafayette, IN
IE 486 Work Analysis & Design II Fall 2018, Spring 2019
- Lectures, weekly lab sessions, office hours and grading
- Instructor: Dr. Barrett Caldwell, Dr. Brandon Pitts

IE 535 Linear Programming Fall 2018
- Weekly office hours and grading
- Instructor: Dr. Andrew Liu

IE 559 Cognitive Engineering of Interactive Software Fall 2022
- Lectures, weekly office hours and grading
- Instructor: Dr. Brandon Pitts

IE 578 Applied Ergonomics Fall 2022
- Lectures, weekly office hours and grading
- Instructor: Dr. Vincent Duffy

Guest Speaker
Human Motor Control & Learning Nov. 2023
@ IE/PSY 577 Human Factors in Engineering – Dr. Robert Proctor
Physical & Cognitive Ergonomics in Manufacturing Oct. 2023
@ IE/MGMT 590 Digital Transformation in Industrial Business – Dr. Stephan Biller
Improving Perception of Information & Augmenting Usefulness of Devices Annually
@ IE 590 Human Factors of Gerontechnology – Dr. Brandon Pitts

PROFESSIONAL AFFILIATIONS

Human Factors and Ergonomics Society (HFES)	2018-Present

- Augmented Cognition Technical Group
- Perception and Performance Technical Group
- Surface Transportation Technical Group

Institute of Industrial and Systems Engineers (IISE)	2021-Present
ACM Special Interest Group on Computer-Human Interaction (SIGCHI)	2021-Present

CERTIFICATION

Associate Human Factors Professional (BCPE)	2023