November 11, 2023
Department of Construction Management
College of Engineering
University of Texas at Tyler

Dear Search Committee,

I am delighted to submit my application for the **Assistant Professor of Practice** at the Department of Construction Management at the University of Texas at Tyler. I am currently a Ph.D. candidate in the School of Construction Management Technology at Purdue University, working under the guidance of my co-chairs, Dr. Yunfeng Chen and Dr. Yiheng Feng. My expected graduation date is Dec. 2023. After a thorough review of the job posting, I am confident that my educational background, teaching, research, and service position me as an ideal candidate for this role.

Teaching and Mentoring Experience

I have served as a graduate instructor, lab mentor, and teaching assistant for construction financial management since 2019 Fall at Purdue University. Over the past few years, the course has been delivered both in person and online. I am always committed to making my teaching interactive and encouraging minority students to express their thoughts in class. I frequently check students' progress and ensure my teaching aligns with their learning paces. In a recent teaching evaluation, I received a 4.34/5 rating from the students. For the question, "What was your favorite aspect of this course?", students offered comments, such as "The clear step-by-step explanation for the accounting processes", and "How the instructor was able to communicate well and help the students understand what they were doing".

Furthermore, I developed the material for a new graduate-level course-Human Factors in Construction and Transportation at Purdue, including preparing lecture slides and notes, assignments, and exams. Drawing from my extensive experience in teaching, I am prepared to teach undergraduate and graduate courses related to construction financial management, mechanics, structural analysis, construction estimating and scheduling, graphical communication, human factors in construction, etc.

In terms of my mentoring experience, I have guided both undergraduate and graduate students at Purdue in formulating their research questions, mastering equipment usage, and analyzing data. Moving forward, I am committed to designing and proposing research projects that not only meet the needs of graduate students but also align with the expectations and requirements of undergraduate students.

Research and Grant Writing Experience

My research mainly focused on (1) developing a co-simulation platform to support driving simulation experiments in Connected and Automated Vehicles (CAVs) environments, (2) field testing of CAVs, and (3) intelligent transportation workers monitoring. Regarding human factors in transportation, I developed a co-simulation platform, which can not only support driving simulation experiments but also testing of CAVs in a virtual environment. As for the field testing of CAVs, I tested the Autonomous Truck-Mounted Attenuator (ATMA) at the Indiana Department of Transportation (INDOT) to collect their feedback. For the intelligent transportation workers monitoring, I utilized artificial intelligence methods for workers' activity classification and safety monitoring. I collected data from employees of the INDOT

while they were performing various operations on public roads. The automated construction worker health monitoring includes construction worker fatigue detection and high ergonomic risk posture detection. My previous research experience also equips me with the ability to apply multiple emerging technologies like wearable sensors, deep learning, computer vision, virtual reality, and CAVs. My research work has been published in several journals and presented at conferences, including the Construction Research Congress (CRC), the International Conference on Computing in Civil Engineering (i3CE), and the Transportation Research Board Annual Meeting (TRBAM).

I participated in 9 research proposals development with the guidance from Dr. Yunfeng Chen, amounting to a total of $1,704,405. Four of them have been successfully funded by the National Science Foundation (NSF) and INDOT. I am confident that these invaluable experiences have equipped me with the requisite skills and insights to facilitate a smooth transition from my role as a Graduate Student to an Assistant Professor.

I am enthusiastic about the prospect of collaborating with the faculty at University of Texas at Tyler in developing interdisciplinary research proposals and conducting cutting-edge research across various domains, including, but not limited to, connected vehicles, public health, and innovative big data applications.

Service Experience and Diversity Commitment

Furthermore, I have consistently devoted my time and effort to the service throughout both my undergraduate and graduate journey. I served as a reviewer for several construction domain conferences and engaged in the American Society of Civil Engineers (ASCE) as a student member. During my undergraduate study, I devoted myself to providing students equal opportunities to participate in multiple competitions, such as the Southeast University Structural Innovation Competition, ASCE Steel Bridge Competition, etc.

As an international student, I possess a deep understanding of the challenges that underrepresented students face in accessing and succeeding in higher education. I have consistently integrated my commitment to diversity and inclusion into my research and teaching endeavors at Purdue University. For my research, I have been driven by a commitment that underrepresented populations should equally enjoy the benefits of technological advancements. I tested the Autonomous Truck-Mounted Attenuator (ATMA) with INDOT workers, which protects them from crashes at mobile work zone operations. Many INDOT workers prefer a traditional life and they have been resistant to the use of new technologies, even refusing email for communication and a Kiosk for ordering lunches. I learned and operated the technologies alongside them and explained to INDOT workers in a way that made sense to them. After several months of field testing, they came to appreciate this technology and expressed a desire to use it for their daily operations.

I strongly believe that teaching should be tailored to the diverse needs of all individuals. When I was mentoring in the accounting lab, I always created an interactive environment where students, especially those from underrepresented groups, and felt comfortable to share their ideas. In addition, I maintained a flexible schedule for the students, adapted to students' communication preferences, and offered communication through emails or video meetings to address their queries and concerns about the class. During these semesters affected by COVID-19, I transitioned my lectures and office hours online to ensure that every student could access the learning resources without any hindrances.

Should I be honored with the opportunity to join University of Texas at Tyler as a faculty member, I will continually contribute to the diverse culture of University of Texas at Tyler, and the local community through my teaching, research, and service endeavors.

Please do not hesitate to contact me if you have any questions regarding my application. I appreciate your consideration and look forward to hearing from you.

Sincerely,

Chi Tian

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363 N. Grant St.
West Lafayette, IN, US 47907
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Phone: (765) 409-9643

Statement of Teaching Philosophy and Interests

My teaching philosophy can be summarized as follows: (1) enhancing high-quality engineering education through project-based learning. (2) inspiring students to develop a lifelong passion for learning and to explore cutting-edge methods and techniques.

Throughout my journey at Purdue, I had the privilege of serving as a teaching assistant, lab mentor, and instructor mainly for two undergraduate-level courses as well as a teaching assistant for a graduate-level course. I developed eight weeks of lecture slides, presentation notes, assignments, and exams for a new graduate-level course: Human Factors in Construction and Transportation, which was successfully offered in Fall 2022. Eager to refine my teaching skills, I enrolled in the Classroom Communication for International Graduate Students course offered by the Oral English Proficiency Program (OEPP). This course addressed my errors in pronunciation and increased my awareness of applying interactions, body language, and eye contact in teaching. Additionally, I obtained a certification in Foundations of College Teaching from Purdue University in Fall 2022. In the following sections, I will provide more detailed examples of my teaching experiences and conclude this statement with my plans for future teaching plan.

Teaching Experience

For the past five years, I served as a teaching assistant at Purdue's School of Construction Management Technology, a program accredited by the American Council for Construction Education. In my role, I have been primarily responsible for the construction financial management sections for two 9 credit undergraduate levels courses: Intermediate Pre-Construction Management (CM200) and Advanced Pre-Construction Management (CM300). My journey as a teaching assistant began with foundational tasks such as setting the course contents on Brightspace, grading assignments, and addressing students' questions both through email and meetings. After I refined my teaching skills via Purdue's OEPP program, I evolved into the role of a lab mentor in the Fall of 2020. Since then, I taught several lab sections, engaging with approximately 80 students each semester. To foster a more personalized and interactive learning experience, we divided these students into three lab sections every semester. Although this increased my teaching workload threefold, I still took pride in fostering a more interactive learning environment for students and I could seize the opportunity to improve my teaching skills by practice. After several semesters of practicing and careful consideration of student feedback, I devised a more effective strategy for teaching the financial lab. The approach includes: 1) initiating the lab with a review of the related lecture contents, 2) assigning the lab assignments while encouraging questions and discussions, 3) addressing lab assignments to the whole class, and 4) providing time for individual Q&A. This method was proven effective in helping students bridge theoretical knowledge from lectures to practical application in the labs. It is an immense achievement for me to guide students from expressing confusion to achieving clarity. The students' appreciation, often conveyed by the end of each lab section motivates and inspires me to foster such a learning experience for students.

In Spring 2020, I worked as the graduate instructor for an undergraduate course where I had the opportunity to teach one chapter of financial management. This was a unique and invaluable opportunity for me to teach lectures independently, though the sessions were conducted remotely due to COVID-19. Moreover, in collaboration with my advisor, we

sought effective strategies for remote instruction in Spring 2021. We experimented by comparing the efficacy of watching recorded sessions versus live remote learning, with the participation of over 30 students. Even though current lectures are reverting to in-person teaching nowadays, such experiences continue to inspire me. They drive my commitment to researching and adapting the most effective methodology to improve students' learning experience.

In addition, I developed the course material for a graduate-level course: Human Factor in Construction and Transportation. I was responsible for preparing content for eight weeks of lecture slides, presentation notes, exams, and assignments. The graduate course also includes a hands-on project, which aims to develop graduate students' ability to develop research questions in the human factors area. I also worked with my advisor to fine-tune the course contents multiple times. Finally, it filled me with pride that the course was successfully offered by my advisor at Purdue in 2022 Fall.

Teaching Interests

For my teaching interests, I am prepared to teach the following courses that are currently offered at the Department of Construction Management at University of Texas at Tyler. These courses include Introduction to Construction Management, Principles of Finance, Construction Estimating, Construction Structural Systems I, Construction Safety, Construction Scheduling, Construction Applications for Concrete, Construction Applications for Steel etc.

Furthermore, I am prepared to teach the following new courses: Human Factors in Construction and Transportation, Advanced Technology in Construction, and Transportation Engineering. I can always prepare and develop new courses based on the needs of Department of Construction Management at University of Texas at Tyler.

Chi Tian
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Phone: (+1) 765-409-9643 Email: tian154@purdue.edu

EDUCATION

Purdue University Aug. 2018 – Dec. 2023 (Expected)
Ph.D. Candidate, School of Construction Management Technology *West Lafayette, IN*
Dissertation Title: Automated Construction Worker Safety and Health Management using Wearable Sensors and Machine Learning.

- Ph.D. committee co-chairs: Dr. Yunfeng Chen and Dr. Yiheng Feng
- Ph.D. committee members: Dr. Jiansong Zhang and Dr. Robert Proctor

Southeast University Aug. 2014 – Jun. 2018
B.E., Engineering Mechanics, School of Civil Engineering *Nanjing, China*

- GPA 3.55/4.0

TEACHING INTERESTS

Statics, Mechanics of Materials, Structural Mechanics, Structural Design and Analysis, Fluid Mechanics, Graphical Communication, Construction Financial Management, Construction Planning, Construction Estimation, Construction Safety, Transportation Engineering, Human Factors in Construction and Transportation, Construction Safety and Productivity Management, Advanced Technology in Construction

RESEARCH INTERESTS

Construction Health and Productivity, Human Factors in Construction and Transportation, Ergonomic risk, Physiological Measurements, Wearable Sensors, Building Information Modeling (BIM), Driving Simulation, Connected and Automated Vehicle (CAV), CAV Field and Virtual Testing, Digital Twin, Machine Learning, Computer Vision

TEACHING EXPERIENCE

Graduate Instructor **Spring 2020**
School of Construction Management Technology, Purdue University
Teaching Certification: Foundation of College Teaching, Purdue University Fall 2022
Role:

- Lectured one chapter on construction financial management remotely.
- Conducted research on students' preference between pre-recorded and real-time remote learning.

Lab Mentor **Fall 2020 - Now**
School of Construction Management Technology, Purdue University
CM 200: Intermediate Pre-Construction Management (Financial Management Section)
CM 300: Advanced Pre-Construction Management (Financial Management Section)
Role:

- Instructed one to two lab construction financial management sections each semester

from Fall 2020, engaging approximately 80 students each term.
- Reviewed relevant lecture content, assigned lab assignments, and addressed students' questions related to the lab assignment.
- Graded students' lab assignments and provided timely feedback.

Teaching Assistant **Fall 2019 - Now**
School of Construction Management Technology, Purdue University
CM 200: Intermediate Pre-Construction Management (Financial Management Section)
CM 300: Advanced Pre-Construction Management (Financial Management Section)
- Graded and provided feedback for students' assignments, and projects.
- Drafted emails to invite industry partners to provide feedback for the CM200 final project.
- Set up the reading quizzes, assignments, and projects.
- Responded to students' questions by email, remote meetings, and holding office hours.

PUBLICATIONS

Journals - Published

[J1] Feng, Y., Chen, Y., Zhang, J., **Tian, C**., Ren, R., & Proctor, R*. (2023). Human-Centered Design of Next Generation Transportation Infrastructure with Connected and Automated Vehicles: A System-of-Systems Perspective. *Theoretical Issues in Ergonomics Science.* 1-29 DOI: 10.1080/1463922X.2023.2182003

[J2] Ren, R., Li, H., Han, T., **Tian, C**., Zhang, C., Zhang, J.*, Proctor, R., Chen, Y., & Feng, Y. (2023). Vehicle Crash Simulations for Safety: Introduction of Connected and Automated Vehicles on the Roadways. *Accident Analysis and Prevention.* 186, 107021. DOI: 10.1016/j.aap.2023.107021

[J3] Guo, X., **Tian, C**., Chen, Y.*, & Zhang, J. (2021). Case Study of Building Information Modeling Implementation in Infrastructure Projects. *Transportation Research Record*. 2676 (2) DOI: 10.1177/03611981211045060

Journals - Under Review

[J4] **Tian, C**., Chen, Y., Zhang, J., & Feng, Y.* (2023). Integrating Domain Knowledge with Deep Learning Model for Automated Worker Activity Classification. *Journal of Information*

[J5] Zhang, C., **Tian, C.,** Han, T., Li, H., Feng, Y.*, Chen, Y., Proctor. R., & Zhang, J. (2023). Evaluation of Infrastructure-based Warning System on Driving Behaviors – A Roundabout Study. *Accident Analysis and Prevention. (Under Review)*

Journals - Invited Submission

[J6] **Tian, C.**, Chen, Y., Zhang, J., & Feng, Y.* (2023). Data Fusion between Kinematic and Physiological Signal to Support Construction Worker Activity Classification at Mobile Work Zones. *Invited to Intelligent Transportation Infrastructure. (Invited Submission)*

Journals - Under Preparation

[J7] **Tian, C.**, Zhang, C., Han, T., Feng, Y.*, Chen, Y., Zhang, J., & Proctor, R. (2023). Evaluating In-Vehicle Warning Impacts and Enhancing Traffic Safety: A Data-Driven

Approach Using Drivers' Performance and Eye Movements at Roundabouts. *Expect to submit to Accident Analysis and Prevention.* (*Under Preparation*)

[J8] **Tian, C.**, Chen, Y., Zhang, J., & Feng, Y.* (2023). Feature Level Data Fusion for Construction Worker Physical Fatigue Monitoring using the eXplainable Artificial Intelligence (XAI) Methods. *Expect to submit to Journal of Construction Engineering and Management.* (*Under Preparation*)

[J9] **Tian, C.**, Chen, Y., Zhang, J., & Feng, Y.* (2023). Detection of Construction Workers' Postures with High Ergonomic Risk using Graph Neural Network: Case Study of Mobile Work Zone. *Expect to submit to Advanced Engineering Informatics.* (*Under Preparation*)

[J10] **Tian, C.**, Chen, Y., Zhang, J., & Feng, Y.* (2023). Data Fusion between IMUs and Image Data for Construction Worker Activity Classification. *Expect to submit to Automation in Construction.* (*Under Preparation*)

[J11] **Tian, C.**, Guo. X., Wu, H., Chen, Y.*, Zhang, J., & Feng, Y. (2023). Work Zones Accidents Analysis: Semantic Analysis and Primary Factors Classification using Machine Learning Models *Expect to submit to Accident Analysis and Prevention.* (*Under Preparation*)

[J12] **Tian, C.**, Chen, Y.*, Zhang, J., & Feng, Y. (2023). Perception and Acceptance of Autonomous Truck-Mounted Attenuator (ATMA) Among Indiana Workers: A Case Study. *Expect to submit to Traffic Injury Prevention.* (*Under Preparation*)

Conference Proceedings - Published

[C1] **Tian, C**., Chen, Y.*, Feng, Y., & Zhang, J. (2024). Fine-Tuning Vision Transformer (ViT) to Classify Highway Construction Workers' Activities. *Construction Research Congress 2024 (CRC 2024)*. Des Moines, IA. Mar. 2024. (*Accepted)*

[C2] **Tian, C**.*, Wu., H.*, Chen, Y.*, Feng, Y. *, & Zhang, J.* (2023). Exploration of Latent Themes in Truck-Mounted Attenuator (TMA) Related Accidents using Natural Language Processing. *2023 ASCE International Conference on Computing in Civil Engineering (i3CE 2023).* Corvallis, OR, Jun. 2023. (*Accepted)*

[C3] **Tian, C**.*, Kang, K.*, Zheng, Y.*, Song, K.*, & Debs, L.* (2023). Feasibility of Low-Cost 3D Reconstruction of Small Infrastructure Assets: A Case Study of Fire Hydrants. *2023 ASCE International Conference on Computing in Civil Engineering (i3CE 2023).* Corvallis, OR, Jun. 2023. (*Accepted)*

[C4] **Tian, C**., Chen, Y., Feng, Y., & Zhang, J. (2022). Worker Activity Classification using Multimodal Data Fusion from Wearable Sensors. *19th International Conference on Computing in Civil & Building Engineering (ICCCBE 2022)*. Cape Town, South Africa. Oct. 2022. (*Accepted)*

[C5] **Tian, C**.*, Wu, H., & Chen, Y. (2022) College Students' Workload and Productivity for Different Types of Tasks before and during COVID-19 Pandemic in the US. *Proceedings of the 9th International Conference on Construction Management and Project Management* (*ICCEPM 2022*). Las Vegas, NV. Jun. 2022.

[C6] **Tian, C**.*, Xiao, J.*, Chen, Y.*, Feng, Y.*, & Zhang, J*. (2022) Implementation, Benefits, and Challenges of Autonomous Truck-Mounted Attenuator. *International*

Conference on Transportation and Development 2022 (*ICTD 2022*) (pp. 120-128). Seattle, WA. May. 2022. DOI: 10.1061/9780784484333.011

[C7] Kuang, B.*, **Tian, C**.*, Wu, H.*, Chen, Y.*, & Debs, L.* (2022). The Impact of Remote Learning on College Students' Workload and Productivity during COVID-19 Pandemic. *Construction Research Congress 2022 (CRC 2022)* (pp. 192-203). Arlington, VA. Mar. 2022. DOI: 10.1061/9780784483985.020

[C8] **Tian, C.,** Guo, X., & Chen, Y.* (2020). The Perceived Impact of Building Information Modeling on Construction Performance. *Proceedings of the 8th International Conference on Innovative Production and Construction (IPC 2020).* Hong Kong. Dec. 2020. https://linjiarui.net/files/ipc2020_proceedings.pdf

[C9] **Tian, C**., Guo, X., Chen, Y.*, Debs, L., & Zhang, J. (2019). The Change of Building Information Modeling Maturity in the Last Five Years. *International Council for Research and Innovation in Building and Construction (CIB)*. Hong Kong. Jun. 2019. https://www.irbnet.de/daten/iconda/CIB_DC32324.pdf

[C10] **Tian, C**.*, Chen, Y.*, Zhang, J.*, & Cox, F.* (2019). Global Building Information Modeling Maturity. *International Conference of Construction and Real Estate Management (ICCREM 2019)*. Banff, Alberta, Canada. May. 2019. DOI: 10.1061/9780784482308.009

Note: (indicates the corresponding author(s))*

Technical Reports - Published

[R1] Guo, X., **Tian, C.**, Xiao, J., Chen, Y., & Zhang, J. (2021). Life Cycle Integration of Building Information Modeling in Infrastructure Projects. *Joint Transportation Research Program Publication No. FHWA/IN/JTRP-2021/30*. West Lafayette, IN: Purdue University. DOI: 10.5703/1288284317356

[R2] **Tian, C.**, Wu, H., & Chen, Y. (2022). A Case Study of Drivers' Perceptional, Cognitive and Behavioral Responses to Traffic Signs or Other Delineation Devices for High-Crash Rural Curve Areas. *Indiana Local Technical Assistance Program (LTAP)*. West Lafayette, IN: Purdue University.

Technical Reports - Under Preparation

[R3] **Tian, C.**, Chen, Y., Feng, Y., & Zhang, J. (2023). Implementation Exploration of Autonomous Vehicles: Impacts of Autonomous Truck-Mounted Attenuator (ATMA) on INDOT Work Zone Safety, Mobility, and Crews' Perception/Behavior/Productivity. *Joint Transportation Research Program Publication.* West Lafayette, IN: Purdue University. (*Under Preparation*)

Book

[B1] Chen, Y., & Muehlhausen, F. (2023). Practical Construction Accounting and Financial Management. Purdue University Press. https://www.press.purdue.edu/9781612497655/practical-construction-accounting-and-financial-management/

Contributions:
Chapter 7: Overhead and Profit Allocation (**Editing and Proofreading**)

Chapter 8: Company Cost Control (**Editing and Proofreading**)
Chapter 9: Company Cash Flow (**Editing and Proofreading**)

GRANT WRITING EXPERIENCE

Total Submitted: $1,704,405.
Funded: $1,013,105; Under Review: $208,975; Not Funded: $482,325.

Research Proposals - Funded

[P1] Automated Personalized Ergonomic Risk Report Generation System
Amount: **$283,147**; Sponsor: **Indiana Department of Transportation**
PI: Dr. Yunfeng Chen
Role:

- Participated in the development of research ideas.
- Led writing of the research needs statement and drafting of the full proposal.
- Prepared the slides and presentation notes for the research meeting with INDOT.
- Conducted a preliminary ergonomic risk analysis using the video data provided by INDOT.

[P2] EAGER: SAI: Human-Centered Design and Enhancement of Next-Generation Transportation Infrastructure with Connected and Automated Vehicles
Amount: **$300,000**; Sponsor: **National Science Foundation**
Co-PI(s): Dr. Yunfeng Chen
Role:

- Reviewed recent literature related to human-centered design for next-generation transportation infrastructure.
- Participated in the research idea development.
- Contributed to the drafting of the concept paper and full proposal.
- Complied with an equipment list from Dr. Yunfeng Chen's lab to support the funding application.

[P3] Implementation Exploration of Autonomous Vehicles: Impacts of Autonomous Truck-Mounted Attenuator (ATMA) on INDOT Work Zone Safety, Mobility, and Crews' Perceptions / Behavior / Productivity
Amount: **$330,374**; Sponsor: **Indiana Department of Transportation**
PI: Dr. Yunfeng Chen
Role:

- Participated in the research ideas development.
- Led the drafting and revision of the full proposal and planned the project schedule.
- Prepared the research slide and presentation notes to communicate the research proposal idea and seek feedback from INDOT.

[P4] Exploration of Color Patterns for Improving Work Zone Safety and Perception
Amount: **$99,584**; Sponsor: **Indiana Department of Transportation**
PI: Dr. Yunfeng Chen
Role:

- Participated in the research ideas development.
- Participated in the draft of the full proposal and research needs statement writing.

Research Proposals - Under Review

[P5] Upgrading D. Dorsey Moss Construction Lab: Proposal for Future Research and Teaching
Amount: **$ 208,975;** Sponsor: **Purdue University**
Co-PI: Dr. Yunfeng Chen
Role:

- Complied list of advanced driving simulators to facilitate studies related to human factors in transportation.
- Created and prepared presentation slides for funding acquisition purposes.

Research Proposals - Unfunded

[P6] Acquisition of Human Motion Analysis Instruments with Modeling System, Foot Dynamics, Hand Motion, and Full-Body Motion Analysis
Amount: **$ 108,929**; Sponsor: **Purdue University**
Co-PI: Dr. Yunfeng Chen
Role:

- Investigated various cutting-edge devices aimed at enhancing construction workers' health and productivity management.
- Reviewed the latest literature about construction worker health and productivity management and complied with the devices applied in that research.
- Selected the devices considering the future research directions, prices, and usage cases.

[P7] Development of Human-like Connected Autonomous Vehicles Control for Mountainous Areas
Amount: **$85,000**; Sponsor: **U.S. Department of Transportation**
Co-PI: Dr. Yunfeng Chen
Role:

- Led the research ideas development based on the funding requirements of the university transportation centers (UTC).
- Attended the workshop: University Transportation Centers (UTC) Technology Transfer to get the latest information for the funding application.
- Led the drafting and revision of the full proposal.

[P8] Organizational Structures and Processes to Enable Cultivating Change
Amount: **$238,396**; Sponsor: **Construction Industry Institute**
PI: Dr. Yunfeng Chen
Role:

- Participated in the full research proposal writing.
- Participated in the research ideas development.
- Collaborated with two graduate students to deliver the research proposal.

[P9] Improving the Design of Digital Skills Training Using Eye Movement and Electroencephalogram (EEG) Data
Amount: **$50,000**; Sponsor: **Facebook**
PI: Dr. Yunfeng Chen
Role:

- Participated in the full research proposal writing.
- Participated in the research ideas development.

RESEARCH EXPERIENCE

Graduate Research Assistant **Jun. 2019 - Now**

School of Construction Management Technology, Purdue University

[RP1] EAGER: SAI: Human-Centered Design and Enhancement of Next Generation Transportation Infrastructure with Connected and Automated Vehicles Sep. 2021 – Now
PI: Dr. Robert Proctor, Co-PIs: Dr. Yunfeng Chen, Dr. Yiheng Feng, Dr. Jiansong Zhang
Sponsor: **National Science Foundation (NSF)**

- Developed a co-simulation platform with Webots and SUMO to support the driving simulation incorporating real traffic flow and road geometry.
- Integrated the data collection functions including driving performance, eye movement, and physiological data into the co-simulation platform to facilitate driving simulation experiments.
- Designed and conducted a human driving simulator experiment involving 36 participants.
- Analyzed the acquired driving performance, eye movement, and physiological data.

[RP2] Implementation Exploration of Autonomous Vehicles: Impacts of Autonomous Truck-Mounted Attenuator (ATMA) on INDOT Work Zone Safety, Mobility, and Crews' Perceptions / Behavior / Productivity Aug. 2021 - Now
PI: Dr. Yunfeng Chen, Co-PIs: Dr. Yiheng Feng, Dr. Jiansong Zhang
Sponsor: **Indiana Department of Transportation (INDOT)**

- Conducted a one-week closed road testing and a five-week open road testing of the ATMA system in Indiana, spanning three types of roads and four mobile work zone operations.
- Gathered data on workers during mobile work zone operations, including physiological, video, and kinematic data.
- Analyzed the kinematic data for workers' activity classification using the artificial neural network (ANN) model and improved the ANN model accuracy by integrating domain knowledge.
- Utilized Vision Transformer (ViT) for workers' activity classification from video data.
- Developed machine learning models for INDOT workers' real-time fatigue monitoring using physiological data.

[RP3] Exploration of Color Patterns for Improving Work Zone Safety and Perception Aug. 2023 - Now
PI: Dr. Yunfeng Chen, Co-PIs: Dr. Jiansong Zhang
Sponsor: **Indiana Department of Transportation (INDOT)**

- Developed driving simulation for the driving experiment.
- Mentored graduate students to learn coding and developing the co-simulation platform.

[RP4] A Case Study of Drivers' Visual Attention and Behavioral Responses to Traffic Signs or Other Delineation Devices for High-Crash Areas Aug. 2019 - Aug. 2022
PI: Dr. Yunfeng Chen
Sponsor: **Indiana Local Technical Assistance Program (LTAP)**

- Learned and developed the driving simulation using the STISIM driving simulator.
- Collected and analyzed eye movement data using Gaze point GP3.
- Designed and performed a driving simulation experiment with 30 participants.
- Developed an automated eye movement processing method that integrates computer vision techniques for automated indicators extraction for areas of interest (AOI).
- Filtered the Indiana crash data at the curve roads to find the most representative curve as the driving simulation case.

- Communicated with the funding agency by email about their needs, requirements, and requests for support.

[RP5] Life Cycle Integration of Infrastructure Information Modeling Aug. 2019 - Aug. 2022
PI: Dr. Yunfeng Chen, Co-PI: Dr. Jiansong Zhang
Sponsor: **Indiana Department of Transportation (INDOT)**

- Developed algorithm to convert CityGML into Industry foundation classes (IFC) to enhance data interoperability for infrastructure data management.
- Developed the application to search for information related to the IFC model.
- Surveyed to collect designers, contractors, and INDOT officers' feedback on developing a united infrastructure information model.

SERVICE AND LEADERSHIP

Professional Affiliation
Student Member, American Society of Civil Engineers (ASCE) 2020 - Present

Reviewer
Reviewer, ASCE International Conference on Computing in Civil Engineering 2023
Reviewer, ASCE Construction Research Congress 2022 2022
Reviewer, ASCE Construction Research Congress 2020 2020

Mentoring

- Ze Wang, Graduate Research Assistant, School of Construction Management, Purdue
- Songyuan Zheng, Graduate Research Assistant, School of Construction Management, Purdue
- Xinran Hu, Graduate Research Assistant, School of Construction Management, Purdue
- Hao Wu, Undergraduate Research Assistant, School of Construction Management, Purdue

Leadership
Science and Technology Association of Civil Engineering, Southeast University
President May. 2016 – May. 2017

- Managed an association with more than 100 students and six departments.
- Communicated with five instructors to provide academic support for more than 2,000 students in the School of Civil Engineering.
- Organized trials in Southeast University such as the ASCE Steel Bridge Competition, Asian Bridge Competition, BIM Invitational Tournament in Eastern China, and Organized Southeast University Structural Innovation Competition (more than 4000 participants).

SKILLS & CERTIFICATES

Certifications: Foundation of College Teaching, Purdue University
Programming Skills: Python, C#, C++, C, TensorFlow, Keras, Scikit-learn
Software: Webots (Robotics Simulation), SUMO, VISSIM, STISIM (Driving Simulator), Xsens (Human Activity Capturing and Analysis), Microsoft Project, SYNCHRO, AutoCAD, Revit, Rhino, Python, Unity 3D, ANSYS
Language: Fluent in English, Native in Chinese

List of References

Reference Name: Yunfeng Chen

Associate Professor, School of Construction Management Technology, Purdue University

Phone: 765-494-6374

Email: chen428@purdue.edu

Reference Name: Yiheng Feng

Assistant Professor, Lyles School of Civil Engineering, Purdue University

Phone: 765-496-5025

Email: feng333@purdue.edu

Reference Name: Jiansong Zhang

Associate Professor, School of Construction Management Technology, Purdue University

Phone: 765-494-1574

Email: zhan3062@purdue.edu