

ZHENG LI

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PROFESSIONAL EXPERIENCE

Tesla

Sr. Analysis Engineer (FEA)

Analysis Engineer (FEA)

Fremont, CA

Feb 2025 - present

Mar 2023 - Jan 2025

Leading structural simulation attributes of New Model Y , Cybercab , Cybertruck  with finite element analysis

- Delivered new gigacasting rear body for new Model Y with 6% cost reduction & improved structural performance.
- Designed new Model Y rear bumper with high cost efficiency, dynamic impact safety, and static structural integrity.
- Developed Cybercab battery pack in cell/module/system/assembly FEA, enhanced electro-mechanical integration.
- Performed material test/correlation for new laser spotweld, replaced conventional welds, reduced circle time 10x.
- Conducting non-linear full-scale/component dynamic/static analysis, improving CAE correlation to test results.

Rivian

Sr. Crash Structures Engineer

Irvine, CA

Jun 2022 – Mar 2023

Design and development of Rivian electric vehicle model R1S and R2 

- Engineered front-end structure with first principles and FEA to drive design toward high crashworthiness.
- Delivered cost efficient structure that met low speed targets and balanced requirements for other load cases.
- Cooperated with studio, test, packaging teams for design iterations and check points in perspective of FEA.

Rivian

Crash Structures Engineering Intern

Plymouth, MI

Jun 2021 – Aug 2021

Design optimization for front-end crash structures of Rivian electric pickup truck R1T 

- Implemented FEA and adaptive optimization to obtain crash-can's optimal structural design & material selection.
- Conducted crash analysis on system and vehicle levels for performance rating based on federal test standards.
- Delivered a validated optimal prototype and provided future design guidance on R1T crash structures.
- Achieved 20% weight saving per crash-can and 12% improvement to IIHS intrusion rating.

Impact and Structural Optimization Laboratory, University of North Carolina at Charlotte

Research Assistant

Charlotte, NC

Aug 2018 – May 2021

Collaboration & funding under North Carolina Department of Transportation (NCDOT) research projects

Constitutive material modeling and dynamic impact analysis for bio-composites (bighorn sheep horn) 

- Developed the anisotropic constitutive material model with plastic hardening and strain-rate sensitivity.
- Validated constitutive model against uni-axial testing data and implemented into LS-DYNA subroutine.
- Conducted explicit analysis for bighorn sheep horn under dynamic impact for energy absorption study.

Evaluation of four bridge rail systems for compliance with 2016 ed. manual for assessing safety hardware 

- Performed dynamic FEA of vehicular impacts in LS-DYNA on NCDOT bridge rail systems.
- Located crash safety risks and investigated structural design improvement through parametric study.
- Obtained crash performance evaluation based on vehicular safety factors, then passed federal test standards.
- Documented results to NCDOT for Federal Highway Administration's approval on statewide installation.

Risk assessment of roadside utility structures under vehicular impacts 

- Evaluated crash safety using FE modeling and simulation on NCDOT's new cluster mailboxes and bus shelter.
- Predicted occupant response through integration of Hybrid III dummy, airbag and seatbelt restraint system.
- Indicated minimal risk levels for occupant injuries during vehicular impacts, then passed safety requirements.
- Provided NCDOT with occupant risk assessment and structural enhancement on new roadside utilities.

Vehicle Energy and Safety Laboratory, Beihang University

Research Assistant

Beijing, China

Jul 2017 – Jun 2018

Multiphysics and safety analysis of automotive lithium-ion batteries for Jaguar Land Rover under abusive loads 

- Investigated LCO and NCA cylindrical batteries' mechanical and electrical behaviors by experiments and FEA.
- Improved battery FE model's correlation with test by coupling with effects of strain rate and state of charge.
- Parameterized and validated numerical models of 18650 lithium-ion batteries used in electric vehicles.
- Found root cause of electrical short circuit under abusive loadings (i.e., compression, indentation, bending).

EDUCATION

University of North Carolina at Charlotte (GPA 3.9/4.0)

Charlotte, NC

PhD in Mechanical Engineering

Aug 2018 – May 2022

Dissertation: Constitutive modeling and dynamic impact analysis of bighorn sheep horn

Beihang University (GPA 3.8/4.0, top 10%, *summa cum laude*)

Beijing, China

B.E. in Automotive Engineering & B.S. in Mathematics, Advisor: Prof. Jun Xu

Sep 2014 – Jun 2018

Thesis: Mechanical integrity study of automotive 18650 lithium-ion batteries

TECHNICAL SKILLS

Computational mechanics: non-linear finite element analysis (FEA), constitutive material modeling and validation

FEA tools: LS-DYNA (with user subroutine), ABAQUS, ANSA, META, LS-PrePost, Hypermesh

Material: material testing and characterization, solid mechanics

Design optimization: metamodeling

CAD tools: SolidWorks, AutoCAD, 3D Experience

Scripting: Python, C, Fortran, MATLAB

PUBLICATIONS

1. Palta, E., Fang, H., Wang, Q., & Li, Z. (2025). Investigation of Dynamic Impact Behavior of Bighorn Sheep Horn. *International Journal of Solids and Structures*, 307, 113133.
2. Li, Z. (2022). *Constitutive Modeling and Dynamic Impact Analysis of Bighorn Sheep Horn*. (Publication No. 29069156) [Doctoral dissertation, University of North Carolina at Charlotte].
3. Fang, H., Li, Z., Fatoki, J., & Stolle, C. (2022). *Evaluation of Four Bridge Rail Systems for Compliance with the 2016 Edition of Manual for Assessing Safety Hardware (MASH)* (No. NCDOT 2019-23). Research and Analysis Group, North Carolina Department of Transportation.
4. Li, Z., Fang, H., Fatoki, J., Gutowski, M., & Wang, Q. (2022). A numerical study of strong-post double-faced W-beam and Thrie-beam guardrails under impacts of vehicles of multiple size classes. *Accident Analysis & Prevention*, 159, 106286.
5. Li, Z., Fang, H., & Wang, Q. (2021). *Crash safety evaluation of three-bar metal bridge rail using finite element analysis* [Conference]. 16th U.S. National Congress on Computational Mechanics, Chicago, IL.
6. Fang, H., Li, Z., Fatoki, O., & Palta, E. (2020). *Risk assessment of roadside utility structures under vehicular impacts* (No. NCDOT 2018-24). Research and Analysis Group, North Carolina Department of Transportation.
7. Li, Z., Palta, E., Fatoki, J., & Fang, H. (2019). *Vehicular impact analysis and safety evaluation of clustered mailboxes* [Conference]. 15th U.S. National Congress on Computational Mechanics, Austin, TX.
8. Fatoki, J., Fang, H., Palta, E., & Li, Z. (2019). *Performance Evaluation of a Two-Bar Bridge Rail Using Finite Element Analysis* [Conference]. 15th U.S. National Congress on Computational Mechanics, Austin, TX.
9. Fang, H., Palta, E., Li, Z., & Fatoki, O. (2019). *Performance evaluation of cable barriers on a 6:1 sloped median under MASH TL-3 conditions* (No. NCDOT 2017-13). Research and Analysis Group, North Carolina Department of Transportation.

AWARDS

Doctoral fellowship, UNC Charlotte

2018 – 2022

Travel award, 16th U.S. National Congress on Computational Mechanics Conference, USACM

2021

Outstanding graduates, Beihang University

2018

MENTORING & TEACHING EXPERIENCE

Undergraduate Thesis Mentor

UNC Charlotte

Finite element analysis in orthopedics using implicit analysis in Abaqus

Jan 2020 – Dec 2020

Mentees:

- Lindsey Brewer (now Measurements Engineer at Corning)
- Ryan Harbert (now Operations Supervisor at Pike Engineering)
- Kathleen McCall (now Mechanical Engineer)

Teaching Assistant

UNC Charlotte

Courses offered by Dept of Mechanical Engineering and Engineering Science

Aug 2018 – May 2022

- MEGR2141 Engineering Mechanics, 110 students each offering, Fall 2018, Fall 2019, Fall 2020, Spring 2021
- MEGR3152 Mechanics and Materials Lab, 80 students, Fall 2021, Spring 2022
- MEGR2240 Computational Methods, 20 students, Spring 2020
- MEGR3225 Intro Finite Element Analysis, 20 students, Spring 2019