Mateng Cheng

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Summary

- Civil Engineering Ph.D. with experience in **structural analysis, computational modeling, and engineering data processing** for infrastructure applications.
- Skilled in translating complex technical data into **engineering-ready models, exhibits, and clear deliverables** for interdisciplinary teams.
- Proficient in **SAP2000, AutoCAD 3D, ABAQUS, Python, and MATLAB**; familiar with engineering drafting workflows and structural analysis.

Education

Case Western Reserve University | Cleveland, OH, USA Aug 2021 – Feb 2027 (Expected)
Ph.D., Civil Engineering

Columbia University | New York, NY, USA Sep 2018 – Feb 2021
M.S., Civil Engineering & Engineering Mechanics

Central South University | Changsha, China Sep 2013 – Jun 2017
B.S., Civil Engineering

Certifications

Fundamentals of Engineering (FE) Civil Exam Passed, 2026
Eligible for Engineer-in-Training **(EIT)** certification
https://account.ncees.org/rn/2179488-1941964-aa01601

Relevant Engineering Experience

Long-Span Suspension Bridge 3D CAD Modeling & Structural Analysis | SAP2000, AutoCAD 3D | Columbia University

- Built an integrated **3D structural model** and **topographic/terrain model** for an 800 m main-span suspension bridge.
- Generated **plans, sections, and detail views** from the 3D model to support design communication and technical review.
- Performed SAP2000 vibration analyses under multiple structural scenarios, including dead load, prestress loss, and cable failure.
- Summarized structural response results and supported iterative model refinement using consistent **layering, annotations, and geometric coordination**.

Structural Vibration & Finite Element Modeling | MATLAB, ABAQUS | Columbia University

- Built finite element models and performed vibration and frequency analyses to evaluate prestressed concrete beam behavior using simulation and testing data.

Fracture Mechanics FEM | MATLAB, ABAQUS | Columbia University

- Developed mesh-based crack propagation simulations and validated finite element results against analytical solutions.

GIS-Based Flood & Terrain Surface Mapping for Built-Environment Assessment | ArcGIS, Python, MATLAB | Case Western Reserve University

- Built GIS workflows to process wind, rainfall, and flood inundation rasters into **terrain and hazard surfaces** for engineering analysis.
- Integrated building inventory, land use, and socio-economic layers to create **high-resolution spatial datasets** for infrastructure assessment.
- Calibrated and validated spatial layers using historical event datasets and documented modeling assumptions for reproducibility.
- Produced **map exhibits and technical documentation** to support engineering interpretation and downstream modeling.

Probabilistic Impact & Infrastructure Performance Modeling | Python, MATLAB, ArcGIS | Case Western Reserve University

- Built probabilistic simulation workflows (Monte Carlo) to propagate hazard uncertainty through impact models and scenario analyses.
- Developed fragility and vulnerability relationships and generated portfolio-level impact metrics for community-scale assessments.
- Modeled functionality loss and recovery trajectories for buildings, transportation, and lifeline networks under extreme-event scenarios.
- Improved computational efficiency and numerical stability for large-scale simulations via adaptive discretization and step-size strategies.

Industry Experience

Technician Intern – Railway Infrastructure Project | CRCC, Tianjin, China
Jul 2017 – Jun 2018

- Performed structural measurements and supported construction drawing preparation on railway bridges and culverts.
- Designed reinforcement for RC beam elements and checked crack width and deflection against design code limits.
- Prepared calculations and documentation to support field execution and engineering review.

Production Intern – Railway Construction | China Railway No. 5 Bureau, Dali, China
Jun 2017 – Sep 2017

- Conducted field surveying and construction layout using total station and leveling instruments to support alignment and structural positioning.
- Assisted with concrete material testing, including slump and compressive strength specimen preparation, to support construction quality control.
- Supported engineers in monitoring on-site progress and resolving field-related technical issues.

Technical Skills

Structural / Engineering Software: SAP2000, ABAQUS, AutoCAD 3D, Mathcad
Programming: Python, MATLAB
Geospatial / Mapping: ArcGIS, terrain/flood raster processing, spatial dataset development, map exhibit production
Methods: Structural analysis, finite element modeling, Monte Carlo simulation, uncertainty quantification