KAIYUAN SHI

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EDUCATION

Henan University of Engineering **Zhengzhou, China**
B.Eng. in Engineering Cost *Sep 2024 – Expected Jun 2028*

- **Cumulative Average:** 86.93/100 | **Rank:** 1/52
- **Selected Coursework:** Building Structures, Engineering Drawing, Architectural CAD, Civil Engineering Surveying, Probability and Mathematical Statistics, and Introduction to Green Building

RESEARCH EXPERIENCE

Development of Capsule-Based Self-Healing Technology for Stabilized-Soil Subgrades **Jan 2025 – Present**
Competition Project | Core Team Member *Zhengzhou, China*

- Proposed the core concept and co-developed a self-healing stabilized-soil subgrade system integrating calcium-alginate microcapsules containing liquid sodium silicate with blast-furnace slag and fly-ash powders, enabling crack-triggered alkali activation and in-situ repair.
- Participated in the formulation, preparation, and experimental validation of the updated material system, including microcapsule fabrication, dry blending, and progressive compaction. The optimized formulation achieved 91.5% capsule survivability under simulated compaction and up to 96.5% compressive-strength recovery after 28 days.

Triaxial Testing and Rheological Modeling of Nano-SiO_2-Modified Loess **Mar 2025 – Jul 2025**
Course Project | Undergraduate Researcher *Zhengzhou, China*

- Conducted consolidated-drained triaxial tests on 32 remolded loess specimens across four nano-SiO_2 dosages (0–2 wt.%) and four confining pressures (50–300 kPa), quantifying axial and volumetric responses and identifying a 7.94% reduction in final void ratio from 0% to 2% dosage.
- Collaborated on fitting a four-element Burgers model to characterize time-dependent deformation (R^2 = 0.990–0.994), showing that increasing the nano-SiO_2 dosage from 0% to 2% raised the Kelvin elastic modulus from 12.5 to 28.7 MPa and the Maxwell viscosity from 1.05 to 2.21 GPa·min.

PUBLICATIONS

Gao, Y., **Shi, K.**, Yu, H., Xu, X., & Hu, J. (2026). Experimental study on the influence of nano-SiO_2 with different dosages on the deformation characteristics of loess. *Modern Chemical Research, 2026*(3), 75–77. https://doi.org/10.20087/j.cnki.1672-8114.2026.03.024

Gao, Y., Yu, Y., Chen, C., Xu, X., & **Shi, K.** (2026). AI-based simulation of settlement and failure modes in additively manufactured models of soft soil foundations. *Nondestructive Testing and Evaluation,* 1–28. https://doi.org/10.1080/10589759.2026.2633451 **[JCR Q1, IF = 4.3]**

PATENTS

Gao, Y., **Shi, K.**, Hu, J., Xu, X., Li, P., Pei, Y., & Xu, C. Crush-resistant microcapsule self-healing solidified soil road base material and preparation method thereof. Application No. CN202610594670.3 (Pending) **Apr 2026**

Gao, Y., Hu, J., Pei, Y., Xu, X., **Shi, K.**, & Zhang, P. Composite loess roadbed material modified with recycled concrete particles and preparation method thereof. Publication No. CN121609556A (Pending) **Dec 2025**

SCHOLARSHIPS & AWARDS

Scholarships

- Fully Funded Henan Provincial Overseas Study Scholarship **May 2026**
- National Encouragement Scholarship **Nov 2025**

Awards

- "Challenge Cup" Competition—Third Prize, National Level **Nov 2025**
- China International College Students' Innovation Competition—First Prize, Provincial Level **Oct 2025**

ADDITIONAL EXPERIENCE

Private Mathematics Tutor **Dec 2024 – Jul 2026**
Self-employed *Remote*

- Provided one-to-one online mathematics tutoring to one Grade 9 student and one Grade 12 student, adapting explanations and practice to their different learning needs and receiving positive feedback from both students' parents

SKILLS & LANGUAGES

Technical Skills: Triaxial soil testing, concrete 3D printing
Computer Skills: AutoCAD, Glodon quantity surveying software, Origin, Microsoft Office
Languages: Chinese (native), English (CET-4)