

RESUME

Siyuan Song

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Postdoctoral researcher with 10+ years of interdisciplinary experience in solid mechanics, multiphysics simulation, and experimental mechanics. Proficient in FEA, ML, and automation workflows. Led cross-domain R&D projects spanning batteries, soft matter, and material informatics. Seeking an applied R&D position to translate modeling and data-driven insight into robust product solutions.

EDUCATION

Ph.D., Brown University, U.S.

Solid Mechanics (GPA: 3.9/4.0)

Sep.2017 – Feb.2023

Advisor: Prof. Kyung-Suk Kim

M.S.& B.E., Xi'an Jiaotong University, China

Engineering Mechanics (GPA: 90/100)

Sep.2011 – June.2017

Advisor: Prof. Tianjian Lu

SELECTED SKILLS

Programming: Python; MATLAB; C++; Fortran; Mathematica; LaTeX; etc.

Simulation and Modeling: SolidWorks; ABAQUS; COMSOL; FLUENT; LAMMPS; etc.

Experiments & Tools: DIC; AFM; SEM/FIB; Universal Testing Machine; 3D Printing; etc.

Machine Learning: Scikit-learn; Tensorflow; Physics-Informed Neural Networks; etc.

Languages: English (fluent); Chinese (native).

SELECTIVE RESEARCH EXPERIENCE

Solid State Battery – Brown University

03/2023 – Present

Advisor: Prof. Pradeep Guduru,

- Designed and implemented electro-mechanical testing platforms for solid-state batteries.
- Automated batch execution of multi-physics simulation workflows in COMSOL and Abaqus via shell scripting

Selective Publication: **Song, S.**; Shi, C.; Pakhare, A.; et al. Investigation of the Mechanical Properties of Porous Argyrodite Sulfide Electrolytes for All-Solid-State Batteries. *ACS Applied Energy Materials*, 2025.

Machine Learning for Science – Brown University

03/2024 – Present

- Developed physics-informed neural networks for material characterization.
- Design ML-guided high-throughput experimental pipelines for material testing.

Selective Publication: **Song, S.** and Jin, H. Identifying constitutive parameters for complex hyperelastic materials using physics-informed neural networks. *Soft Matter*, 2024, 20(30),

pp.5915-5926.

Soft Matter and Self-Assembly – Brown University

06/2018 – 02/2023

Advisor: Prof. Kyung-Suk Kim,

- Modeled surface creasing in hyperelastic materials using perturbation theory and FEA
- Analyzed the dynamic instability of the superlattice composed of host-patch nanocrystals via Lammmps and phonon dispersion analysis
- Simulated the guided alignment of the DNA chain along the graphene crinkle for nanopore sequencing. Prototyped graphene nanoscale manipulation platforms

Selective Publication: **Song, S.**, Kothari, M. and Kim, K.S. On inherent hyperelastic crease. *Journal of the Mechanics and Physics of Solids*, 2024, 190, p.105716.

Inverse Problem for PSPI Experiments – Brown University

06/2018 – 02/2023

Advisor: Prof. Rodney J Clifton

- Solved the inverse problem of the finite deformation visco-plastic material in pressure-shear plate impact experiments.

Selective Publication: Clifton, R.J.; **Song, S**; and Jiao, T., 2020 November. Inverse problem for PSPI experiments. *In AIP Conference Proceedings*, 2272(1), p. 070008. AIP Publishing LLC.

Porous Media – Xi'an Jiaotong University

09/2014 – 06/2017

Advisor: Prof. Tianjian Lu

- Simulated flow, acoustic, and thermal behavior of porous materials with surface roughness using COMSOL and FLUENT.

Selective Publication: [1] **Song, S.Y.**; Yang, X.H.; Xin, F.X.; et al. Analytical modeling of surface roughness effects on Stokes flow in circular pipes. *Physics of Fluids*, 2018, 023604. [2] **Song, S.Y.**; Yang, X.H.; Xin, F.X.; et al. Modeling of roughness effects on acoustic properties of micro-slits. *Journal of Physics D*, 2017, 50(23).

HONORS AND AWARDS

- Graduate with Honor
Xian Jiaotong University (Prestigious merit-based award) 2017
- First Prize in National University Mechanical Innovation Design Competition
Ministry of Education of China (Top 3% in China) 2014
- Second Prize in China Undergraduate Mathematical Contest in Modeling
Ministry of Education of China (Top 2% in China) 2014
- National Scholarship
Ministry of Education of China (Top 2% in the elite class) 2012