ZEKANG GONG

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EDUCATION

Sichuan University
Bachelor of Engineering *Sept. 2021 - June 2025(expected)*
Major in Mechanics & Software Engineering College of Architecture and Environment
GPA: 3.62/4 (86.39/100) Rank: 3/30 (**10%**)

Core Courses:
Theory of Viscoelasticity, Material Dynamics Behavior and its Application, Elastic Mechanics, Fluid Mechanics, Mathematical Methods in Engineering, Data Structures and Algorithmic, Operating System, Complex Functions and Integral Calculus Conversion, Numerical Methods, etc.

RESEARCH INTERESTS

I am motivated by the use of **theoretical and computational** methods to study geophysical phenomena such as **earthquakes and volcanoes**. I am excited about exploring the Earth and aim for my research to elucidate observational data through a fundamental **physics** study of the mechanisms behind geophysical events.

PROJECTS

Deep Neural Network Based Surrogate Model for Earthquake Rupture Simulation
Supervisor: Prof. Chao Liang
Collaborator: Ziyi Wang *Feb. 2023 - Apr. 2024*

- In this project, we aim to develop a surrogate model for rupture dynamics, with the ultimate goal of enabling dynamic earthquake inversion.
- Analyzed fault distribution of initial stress condition and frictional parameters. And used supercomputers to run rupture dynamics simulations and collect final slip and rupture front data sets.
- Paper writing and visualization.

Boundary Element Method for Fluid-filled Crack
Supervisor: Prof. Chao Liang *Apr., 2023 - Present*

- Derived elastodynamics and fluid boundary integral in frequency domain, following former papers.
- Implemented Matlab code to simulate seismic waves scattered by hyfrofractures in frequency domain, reproducing Pointer 1998.
- Derived Green's function and Boundary Integral Representation for linearized NS equation for compressible fluid

Quadlayer Krauklis Wave Model for Explaining VLP Tremors in the Gulf of Guinea
Supervisor: Prof. Chao Liang *Apr., 2024 - Present*

- Former research on unraveling the excitation mechanism of VLP tremors (Yingjie Xia et al., 2022) simplified the sill horizontal motion and not consider the covering ocean. It's interesting to derive more rigorous dispersion and oscillatory model for quad layer system containing a inviscid ocean, a thin crust, an viscous magmatic sill and elastic half space.
- Formulated governing equations and boundary conditions, there are matrix to be solved and code to be implemented.

2D Finite Element Method Software with GUI for Elastic Mechanics: A Course Project in Computational Mechanics
Supervisor: Prof. Meng Wang *Apr., 2024 - May, 2024*

- Developed a simple finite element method (FEM) elastic solver in C++, integrating GMSH for mesh generation and QT for the graphical user interface.
- Developed a graphical user interface (GUI) for geometry and mesh generation, and implemented visualization of principal stress and displacement using C++ and QT.

ABSTRACTS

Z. Gong, C. Liang, Boundary element method for viscous fluid-filled crack, Integrated Disaster Science Academic Salon, IDMR, Sichuan University, Chengdu, China, Nov., 2023. (Oral) (Excellent Speaker Award)

Z. Wang*, **Z. Gong*** (Co-first), C. Liang#, J. Wang, C. Ren, X. Peng, RuptureNet2D, a deep neural network based surrogate for dynamic rupture simulation in two dimensions, 5th AI for Seismology Seminar, Qingdao, China, Jul., 2024. (Poster) (Excellent Student Poster Award)

PAPER

Submitted Paper:

Z. Gong* (Co-first), Z. Wang*, C. Liang#, J. Wang, C. Ren, X. Peng (2024), RuptureNet2D, a deep neural network based surrogate for dynamic rupture simulation in two dimensions, Journal of Geophysical Research: Solid Earth, under review.

ACTIVITIES

Teaching Assistant Sept., 2023 - Jun., 2024
College of Architecture and Environment
Assisted first- and second-year undergraduates with planning and course study .

SKILLS

Programming: C++, Matlab, SQL, Shell
Techniques: Linux, Docker, Git
Languages: Fluent in English (TOEFL-IBT 96) and native in Mandarin Chinese