

HAIQI FANG

Sichuan University, Chengdu, Sichuan, China

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EDUCATION

Sichuan University

Bachelor of Engineering in Agricultural Water Conservancy Engineering

- Average Point (86.69/100.00), Integrated Ranking (2/52).

Sep. 2016 – June 2020

Chengdu, China

Sichuan University

Master of Engineering in Hydraulics and River Dynamics

- Average Point (85.58/100.00).
- Advisor: Prof. Pengzhi Lin.

Sep. 2020 – June 2023

Chengdu, China

Columbia University

Department of Civil Engineering and Engineering Mechanics

- PhD student.
- Bakhmeteff Fellowship.

Aug. 2024 – Present

New York, USA

EXPERIENCE

Sichuan University

Research Assistant

- Transient wavemaker theory for linear waves – Advisor: Prof. Philip L.-F. Liu.
- Theory and experiment on liquid sloshing – Advisor: Prof. Pengzhi Lin.

June 2023 – July 2024

Chengdu, China

PUBLICATIONS – JOURNAL ARTICLES

Published:

1. **Haiqi Fang**, Lian Tang, Pengzhi Lin, 2024. Bragg scattering of nonlinear surface waves by sinusoidal sandbars. *J. Fluid Mech.*, 979: A13. (doi: 10.1017/jfm.2023.1005)
2. **Haiqi Fang**, Lian Tang, Pengzhi Lin, 2024. Theoretical study on the downshift of class II Bragg resonance. *Phys. Fluids*, 36: 017103. (doi: 10.1063/5.0178754)
3. **Haiqi Fang**, Philip L.-F. Liu, Lian Tang, Pengzhi Lin, 2023. The theory of fifth-order Stokes waves in a linear shear current. *Proc. R. Soc. A*, 479: 20230565. (doi: 10.1098/rspa.2023.0565)
4. **Haiqi Fang**, Lian Tang, Pengzhi Lin, 2023. Homotopy analysis of wave transformation over permeable seabeds and porous structures. *Ocean Eng.*, 274: 114087. (doi: 10.1016/j.oceaneng.2023.114087)
5. Huiran Liu, **Haiqi Fang**, Pengzhi Lin, 2024. A theoretical model for wave attenuation by vegetation considering current effects. *Coast. Eng.*, 190: 104508. (doi: 10.1016/j.coastaleng.2024.104508)

Under review or in prep:

1. **Haiqi Fang**, Pengzhi Lin, 2024 (under review). The near-resonance liquid sloshing under surge excitations: theory and experiment. Submitted to *Proc. R. Soc. A*.
2. **Haiqi Fang**, Peter Lo, Pengzhi Lin, Philip L.-F. Liu, 2024 (in prep). An asymptotic analysis on the leading wave and wave envelope generated by a wavemaker.

ONGOING PROJECTS

Liquid Sloshing Theory

Sep. 2023 – Present

The near-resonance liquid sloshing under surge excitation

- Derived a new second-order solution for steady state waves.
- Conducted experimental studies.

Wavemaker Theory

June 2023 – Present

High-order wavemaker theory for Stokes waves

- Proposed a third-order wavemaker theory for Stokes wave.
- To extend the present theory to fifth-order.

COMPLETED PROJECTS

Wave Transformation over Porous Structures

Sep. 2020 – Dec. 2021

Homotopy analysis of wave transformation over porous structures

First author

- Introduced the Homotopy Analysis Method to solve the Modified Mild Slope Equations.
- Developed a new methodology to study wave transformation over 2-D and 3-D problems.

Shear Effects on Stokes Waves

Sep. 2021 – July 2023

The theory of fifth-order Stokes waves in a linear shear current

First author

- Derived a new fifth-order Stokes wave solution that incorporated current effects.
- Demonstrated better capacities for strong nonlinear waves under intensely sheared currents.

Wave Scattering Theory

May 2022 – Feb. 2023

Bragg scattering of nonlinear surface waves by sinusoidal sandbars

First author

- Derived new Nonlinear Equations for Bragg scattering.
- Proposed new solutions for wave reflection and quantification for frequency detuning.

Wave Resonance Theory

Jan. 2023 – Sep. 2023

Theoretical study on the downshift of Class-II Bragg resonance

First author

- Formulated an analytical solution that can capture the downshift behavior.
- Presented a theoretical formula to quantify the downshift magnitude.

Wave-Current-Vegetation Interaction

Jan. 2022 – Aug. 2022

A theoretical model for wave attenuation by vegetation considering current effects

Second author

- Responsible for the formulation of the theoretical solutions.
- Established solutions for wave attenuation by vegetation for both strong and weak currents.

RESEARCH INTERESTS AND SKILLS

Research Topics: Water Wave Theory, Coastal Oceanography, Coastal Engineering.

Research Skills: Perturbation Methods, Waveflume and Liquid Sloshing Experiments, RANS Model.

Programming & English: Mathematica, Matlab, C, Fortran, LaTeX, IELTS 7.5 (L 7.5, R 8.5, W 7, S 6.5).

PEER REVIEW EXPERIENCE

Acting as reviewers in *Physical Review Fluids*, *Physics of Fluids*.

2024