

Yingchao Peng

Email: ypeng424@usc.edu Tel: (+1)-213-284-6395

Address: 3710 McClintock Ave, Los Angeles, CA 90089

[Google Scholar Profile](#)

EDUCATION

University of Southern California (USC)

CA, USA

- Ph.D candidate in Aerospace and Mechanical Engineering, GPA 3.97/4.0

Sep. 2020-Dec.2025

(Expected)

- Advisor: Professor Paul Plucinsky

The University of Tokyo (UTOKYO)

Tokyo, Japan

- M.E in Systems Innovation, GPA 3.78/4.0

Sep. 2016-Sep. 2019

- Advisor: Professor Katsuyuki Suzuki
- Thesis: *Robust Topology Optimization under Uncertainty*

Huazhong University of Science and Technology (HUST)

Hubei, China

- B.E in Naval Architecture and Ocean Engineering, GPA 3.84/4.0

Sep. 2012-June 2016

- Advisor: Professor Tianyun Li
- Thesis: *Simulation Analysis of Structural Crashworthiness in Ship Collision*
- Selected Awards:
 - ✧ Outstanding Graduate of HUST, 2016
 - ✧ First Prize for Entrepreneurship Business Competition in HKUST Winter Camp, 2015
 - ✧ American Bureau of Shipping Fellowship, 2014
 - ✧ China Shipping Industry Fellowship, 2014
 - ✧ Academic Merit Scholarship, 2013

RESEARCH INTERESTS

-
- Solid Mechanics
 - Mechanical Metamaterials
 - Topology Optimization
 - Finite Element Methods
 - Computational Mechanics

PUBLICATIONS

Peer-Reviewed Journal Publications ([ORCID ID: 0009-0004-9036-8091](#))

- **Yingchao Peng**, Imtiar Niloy, Megan Kam, Paolo Celli, Paul Plucinsky. “Programming bistability in geometrically perturbed mechanical metamaterials” *Phys. Rev. Appl.*, 22(1), 014073 (2024).
- Pingzhang Zhou, **Yingchao Peng**, Jianbin Du. “Topology optimization of bi-material structures with frequency-domain objectives using time-domain simulation and sensitivity analysis” *Struct. Multidisc. Optim.*, 63(2), 575-593 (2021).

CONFERENCE PRESENTATIONS

-
- “Programming Bistability in Geometrically Perturbed Mechanical Metamaterials”, ASME IMECE, Portland, OR, 2024.
 - “Tunable Bistability in Mechanical Metamaterials through Geometric Perturbations”, SoCal Solids Conference, University of Southern California, Los Angeles, CA, 2023.
 - “Tunable Bistability in Mechanical Metamaterials through Geometric Perturbations”, SES Annual Technical Meeting, University of Minnesota, Minneapolis, MN, 2023.

RESEARCH EXPERIENCE

Programming bistability in geometrically perturbed mechanical metamaterials, USC

Sep. 2021-July 2024

Research Assistant (Advisor: Prof. Paul Plucinsky)

- Proposed a strategy that transforms a common, nonbistable metamaterial design into a bistable one.
- Introduced an optimization framework for bistable planar kirigami that incorporates a reduced-order model for the elastic energy, which can be applied to tune the designs with target morphing and mechanical properties.
- Illustrated the versatility of the framework through nonperiodic designs that achieve two arbitrarily shaped stable states.

Topology optimization of bi-material structures with frequency-domain objectives using time-domain simulation and sensitivity analysis, THU

Jan. 2020-Feb. 2021

Research Assistant (Advisor: Prof. Jianbin Du)

- Conducted numerical simulations to obtain optimized topological configurations using a novel time-domain method with frequency-domain objectives for bi-material structures.

Robust topology optimization under uncertainty, UTOKYO

Jan. 2018-Aug. 2019

Research Assistant (Advisor: Prof. Katsuyuki Suzuki)

- Conducted robust topology optimization for two dimensional structures under uncertainties in loading magnitude and direction via optimality criteria method.
- Proposed an approach to implement robust topology optimization for structures under uncertain distributed loads and verified the effectiveness by modeling carrier plate.
- Put forward two modified algorithms to obtain the topological configuration with more distinct boundary based on the standard optimality criteria method and verified the feasibility of these two methods.

Optimization design for CFRP laminated golf club, UTOKYO

Nov. 2016-May 2017

Research Assistant (Advisor: Prof. Katsuyuki Suzuki)

- Simulated a three-point bending test of CFRP laminated golf club and analyzed the structural response to different parameters (material properties and laminated angles) with LS-DYNA and LS-Prepost.
- Proposed an optimal CFRP laminated golf club model with improved bending strength by designing the parameters of outer 2 layers with LS-OPT and LS-DYNA.

Simulation analysis of structural crashworthiness in ship collision, HUST

Dec. 2015-June 2016

Research Assistant (Advisor: Prof. Tianyun Li)

- Analyzed the mechanical mechanism of ship-ship collision and the collision situation on the local scale.
- Modeled and simulated the collision of typical ship structures and analyzed the results by using LS-DYNA and LS-PREPOST.
- Analyzed the influence of collision parameters on the response of collision and put forward effective suggestions to improve crashworthiness.

Structural design for ballast-free ship, HUST

Mar. 2014-Aug. 2014

Research Assistant (Advisor: Prof. Tianyun Li)

- Proposed a new approach to optimize ship shape to design ballast-free ship effectively.
- Analyzed and compared the performances of the parent ship and the design ship with SESAM and MATLAB to verify feasibility of the approach.
- Conducted ship model experiments to validate the approach for designing ballast-free ship.

MENTORSHIP

Viterbi School of Engineering, USC

June 2024-July 2024

SHINE (Summer High School Intensive in Next-Gen Engineering) program mentor

& June 2022-July 2022

- Supervised two high school students on projects titled “Designing and Making Mechanism-Based Metamaterials” and “The Design and Deformations of Mechanism-Based Mechanical Metamaterials”.
- Mentored design, fabrication, and analysis of origami-inspired structures using MATLAB, laser cutting and hands-on experiments.
- Guided MATLAB programming to design planar kirigami patterns and simulate mechanism-based motions.
- Advised and supported the final research presentations delivered at the SHINE research symposium.

TEACHING EXPERIENCE

Viterbi School of Engineering, USC

Jan. 2025-May 2025

Teaching Assistant

& Jan. 2023-May 2023

- *AME 204: Mechanics of Materials and Structures.* Tutored undergraduates, led discussion sections, held weekly office hours, prepared weekly quizzes and exams, graded assignments and examinations.

Viterbi School of Engineering, USC

Jan. 2025-May 2025

Teaching Assistant

- *AME 509: Applied Elasticity.* Led weekly office hours, graded assignments.

School of Engineering, UTOKYO

Aug. 2022-Dec. 2022

Teaching Assistant

- *Mathematical Programming and Optimization, Project Practice: Design for Paper Bridge.* Tutored undergraduates, led discussion sections, graded assignment and examination.

School of Naval Architecture and Ocean Engineering, HUST

June 2017-July 2018

Teaching Assistant

- *Calculus.* Conducted weekly Q & A sessions, designed midterm exam.

ADDITIONAL

Nov. 2012-Jan. 2013

- **Professional skill:** MATLAB, Ansys LS-DYNA, LS-TaSC, Abaqus, Python, AutoCAD, C/C++
- **Language:** Chinese (Native), English (Fluent), Japanese (Fluent)
- **Leadership:** Leader of School Soccer Team
- **Interests:** Soccer, Badminton, Table tennis, Basketball