



Bowen Li

Mechanical Engineering, Ph.D. Candidate

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EDUCATION

University of Central Florida, Orlando, FL, Aug. '21 – Exp. Nov '24

Doctor of Philosophy, Mechanical Engineering

Beijing University of Technology, Beijing, China, Sep. '17 – Aug. '20

Master of Science, Mechanics

Beijing University of Technology, Beijing, China, Sep. '13 – Aug. '17

Bachelor of Science, Mechanical Engineering

PROFESSIONAL EXPERIENCE

University of Central Florida, Orlando, FL, Jan. '23 – May. '23

Graduate Teaching Assistant – EGM 3601 Solid Mechanics

- Graded homework & exams, held office hours, provided solutions for homework & exams, 250 students

University of Central Florida, Orlando, FL, Aug. '19 – present

Graduate Research Assistant – Dr. Kawai Kwok

- Designed and implemented a novel pure bending apparatus for deployable blades and evaluated folding & deployment behavior
- Adopted numerical technique and classical energy theory to verify the experiment accuracy including peak moment, steady moment, deployment time, overshoot angle, oscillation
- Collaborated design and setup of propeller rotation test platform to measure left and drag, compared with Comsol CFD
- Structure parameter optimization base on machine learning(DT)
- Coordinated selection, purchase, setup & operation of optical table, drill press, ultrasonic measurement and laser measurement equipment, composite manufacturing equipment, 3D-printer

China Earthquake Administration, China, Sep. '20– Aug. '21

Junior researcher – FEA for Friction & Fault Mechanics

- Improved previous friction experiment apparatus
- Given a lecturer that cover the FEA using ABAQUS & OptiStruct
- Coordinated & manufactured prototype for chlorite sample
- Designed & built a sensitive and rapid switch for high voltage transmission

Beijing Auto Technical Research Institute, China, Dec. '14 – Feb. '15

Intern – Beijing Automation Technical Research Institute

- Collaborated designing a Damage Detection Sensor
- Assisted 3D modeling and printing for sensor case

Beijing Satellite Manufacturing Factory, China, Sep. '15 – Jan. '16

Intern – Fatigue Testing for Deployable Structure

- Simulated fatigue life for tape spring based on principal stress
- Tape spring strain sensing and comparison with FEA

TECHNICAL SKILLS

CAD	Autodesk CAD, Solidworks, PTC Creo, Inventor, NX
CAE	Abaqus FEA, Comsol CFD, Ansys workbench, Ansys Fluent, Star CCM+, Hyperworks, Multisim
Coding	Python, Matlab, Arduino, ANSYS/APDL
Material	Pure bending test, DIC, Tensile testing, High P&T rock friction testing, column bend testing
Characterization	Heat/cryo chamber, strain gauge, DAQ, LabView
Prototyping	Composite Manufacturing Milling, CNC Turning, 3D Printing, Laser & Waterjet cutting
Languages	Chinese (native) English (fluent)
Other	LaTeX, Windows OS

RESEARCH PROJECTS

Dissertation – Deployable propeller blades (In process)

Proposed and designed a deployable propeller blades harnessing elastic instability adopted by insects in wing folding to achieve tight packaging and fast deployment. Emphasize was given to the principal mechanics for folding and deployment ability, and the aerodynamic performance. Structure optimization will be considered in the next study based on Decision Tree method.

Investigation on Bistable Structure and Optimization

Derived theoretical solution of bistable shell structures, compared with numerical simulation to capture transform processes between states and extract Load-Displacement curves. Discussed different optimal model including polynomial and radial basis function (RBF) surrogate model and optimal bistable Structures.

Mechanical behavior analysis and optimization design for deployable composite tube hinge (Master Thesis)

Designed, manufactured & assembled prototype of composite tube hinge structure. Simulated and tested the composites failure behavior basing HASHIN failure criterion using ABAQUS subroutine. Carried out a dual-steps homogenization to determine woven composites equivalent stiffness and simplification of the highly nonlinear problem. Developed an optimization model based on response surface methodology. Emphasize was given to develop a multi-objective design to improve deployment ability without making material damage.

Quasi-Static analysis of mechanical attributes for metal Tape Spring Hinge (Bachelor Thesis)

Quasi-static finite element simulations of metallic tape spring was completed to investigate moment variation and natural frequency under pure bending condition. Innovation was a sensitivity analysis based on Sobol method and linear regression.

Design and fabrication of Gear Reducer

Designed 2D&3D prototype of two stage reduction gear using Auto CAD and Inventor. Manufactured and assembled parts using computer numerical controlled machine.

PUBLICATIONS

Bowen Li, Hongling Ye, Failure analysis of composite tube hinge and optimization design, DOI: 10.1088/1757-899X/531/1/012062

Hongling Ye, **Bowen Li**, Quasi-Static Folding Mechanical behavior Analysis and Optimization Design for Composite Tube Hinge, DOI: 10.3901/JME.2020.05.172

Bowen Li, Hongling Ye, Yang Zhang. Failure behavior in folding and deployment of composite tape spring based on two different FE models, DOI: 10.1088/1757-899X/531/1/012062

Yang Zhang, Hongling Ye, **Bowen Li**, Mechanical behavior of composite bistable shell structure and surrogate-based optimal design, DOI: 10.1007/s00158-021-02890-7

ACADEMIC HONORS

- Outstanding Graduate of Beijing, BJUT, '20
- Excellent Graduate Thesis, BJUT, '20
- Scientific Research Excellence Award, BJUT, 2018