Yang Yang

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EDUCATION

Sichuan University Sep 2021 - Jun 2025 (expected)

B.ENG. *at Department of Mechanics and Engineering Science & Wu Yuzhang Honors College* (Top 3%)
Major**:** Mechanics
Overall GPA: 3.81/4 (90.03/100)
Important Courses**:** Calculus, Advanced Algebra, Theoretical Mechanics, Mechanics of Material, C Programming, Mathematical Methods in Engineering, Continuum Mechanics, Structural Mechanics, Fluid Mechanics, Computational Mechanics, Experimental Mechanics, Vibration Mechanics

RESEARCH INTERESTS

My research interests are in Robotic Perception and Manipulation, Finite Element Method (FEM) and Deep Learning for Mechanics. They encompass tactile and force sensing, and dexterous manipulation. I particularly interested in designing tactile sensors and utilizing tactile sensing to help robotic dexterous manipulation and surgical operations.

PUBLICATIONS AND PATENTS (* indicates contribute equally, J. = Journal, C. = Conference, P. = Patent)

[J.1] A deep learning approach for low-cycle fatigue life prediction under thermal-mechanical loading based on a novel neural network model
Yang Yang, Bo Zhang, Hao Wu, Yida Zhang, Hong Zhang *(advisor)*, Yongjie Liu, Qingyuan Wang
Engineering Fracture Mechanics, https://doi.org/10.1016/j.engfracmech.2024.110239, Top Journal in Mechanics

[J.2] Machine-learning and finite element-based temperature- and rate-dependent plasticity model: application to the tensile behaviour on MarBN steel
Bo Zhang, **Yang Yang,** Hao Wu, Yida Zhang, Quanyi Wang, Hong Zhang *(advisor)*, Yongjie Liu, Qingyuan Wang
Journal of Materials Engineering and Performance, https://doi.org/10.1007/s11665-024-10167-5

[J.3] Vitire: A Bimodel Visuotactile Tire with High-Resolution Sensing Capability
Shoujie Li*, Jianle Xu*, Tong Wu, **Yang Yang,** Yanbo Chen, Xueqian Wang, Wenbo Ding *(advisor)*, Xiao-ping Zhang
IEEE Transactions on Mechatronics **(Under Review)**

[C.4] Three-dimension Tip Force Perception and Axial Contact Location Identification for Flexible Endoscopes using Tissue-compliant Soft Distal Attachment Cap Sensors
Tao Zhang*, **Yang Yang[1*],** Yang Yang[2], Huxin Gao, Jiewen Lai, Hongliang Ren *(advisor)*
Submitted to *International Conference on Robotics & Automation* ***(ICRA 2025)***

[P.5] A novel approach for low-cycle fatigue life prediction based on deep learning
Hong Zhang *(advisor)*, **Yang Yang**, Bo Zhang, Zhengwei Hu, Yongjie Liu, Qingyuan Wang
CN Invention Patent, CN117725846A, **Grant**

[P.6] A method of calculating a temperature and strain rate dependent plastic hardening model for metallic materials
Hong Zhang *(advisor)*, Bo Zhang, **Yang Yang**, Zhengwei Hu, Yongjie Liu, Qingyuan Wang
CN Invention Patent, CN117558381A, **Grant**

INTERNSHIP EXPERIENCES

Research Assistant Oct 2024 - May 2025 (expected)
The Chinese University of Hong Kong (CUHK), Supervised by Hongliang Ren
Laboratory**:** Lab of *R*obotics, *E*mbodied AI, *N*avigation in Vivo (*LabREN*)

Summer Research Intern Jun 2024 - Aug 2024
Tsinghua University (THU), Supervised by Wenbo Ding
Laboratory**:** *S*mart *S*ensing and *R*obotics Group *(SSR Group)*

Summer Research Intern Jun 2023 - Aug 2023
Shanghai Jiao Tong University (SJTU), Supervised by Daolin Ma
Laboratory**:** *M*anipulation *P*erception and *I*ntelligence Lab *(MPI Lab)*

Research Experiences

Tactile Perception for Surgical Operation Jun 2024 - Present

The Chinese University of Hong Kong (CUHK), Supervised by Hongliang Ren

✧ FBG-based Perception in Flexible Endoscope

- Simulated various loading conditions for Fiber Bragg Grating (FBG) based sensor to assess the sensing capability of multi-mode (radial force, axial force, and axial contact location) tissue-compliant sensor
- Explored sensory capabilities by testing six different fiber arrangements
- Submitted a conference manuscript to the International Conference on Robotics & Automation (ICRA 2025)

✧ Vision-based Tactile Sensing for Pharyngeal Localization

- Developed a homemade vision-based tactile sensor, including fabricated Sensing, Imaging, and Lighting Module

Visuo-tactile Sensor with Convex Surface Apr 2024 - Present

Tsinghua University (THU), Supervised by Wenbo Ding

✧ Simulation and Learning for a Tactile Sensor

- Generated 15 datasets for visuo-tactile sensor using Finite Element Method (FEM)
- Obtained the force and displacement information of the markers from the simulation
- Predicted force distribution from the binary images of convex tactile elastomer using a Neural Network
- Developed algorithms for real-time marker points tracking and 3D coordinate visualization

✧ Simulation for A Bimodal Visuotactile Tire

- Simulated the static loading for tire and obtained the relationship between offset and force
- Submitted a Journal manuscript to IEEE Transaction on Mechatronics

In-situ Mechanical Parameters Extraction for Visuo-Tactile Sensor (GelSlim) Jun 2023 - Nov 2023

Shanghai Jiao Tong University (SJTU), Supervised by Daolin Ma

- Established eight datasets with different indenters using FEM
- Utilized a Transformer model to learn the relationship between mechanical parameters and boundary condition, achieving a mean square error of 0.006

Deep Learning for Low-cycle Fatigue Life Prediction Jun 2023 - Oct 2023

Sichuan University (SCU), Supervised by Hong Zhang

- Proposed a novel neural network model, ConTrans, for low-fatigue life prediction
- Validated the model by using four different materials with all prediction results in 2-factor error band
- Published a paper in the journal 'Engineering Fracture Mechanics' and obtained a China invention patent as the leader

Teaching Assistant

Course***:*** Structural Mechanics Feb 2024 - Jun 2024

Department of Mechanics and Engineering Science, Sichuan University

- Collaborated with the professor to support students in understanding complex concepts related to structural mechanics
- Assisted in grading and providing constructive feedback on test papers and assignments
- Served as a liaison between students and the professor, addressing their queries and concerns effectively

Honors and Awards

First Prize of Sichuan Mechanics Competition Individual Race (Top 2%)	2023
First Prize of Sichuan Mechanics Competition Group Race (Leader) (Top 2%)	2023
First Prize of Academic Scholarship at Sichuan University (Top 3%)	2023
Outstanding Students of Sichuan University (Top 5%)	2023
Wu Yuzhang Honors College Scholarship of Excellence (Top 5%)	2022, 2023

Skills

Programming: C++, Python (Pytorch)
Platform/System: Finite Element Method (ABAQUS, ANASYS, SOFA), SoildWorks, MATLAB, Ubuntu, Linux, VS Code
Hardware: Fabrication of Vision-based Tactile Sensor (3D Printer, Raspberry pi, Printed Circuit Board, Vacuum drying oven)
Languages: Mandarin (Native), English (Fluent)