Yang Yang

Sha Tin, New Territories, Hong Kong SAR, China

Email: youngyyyang@outlook.com ｜ Tel: (+86)18770839023 ｜ Personal Website

EDUCATION

Sichuan University   Sep 2021 - Jun 2025 (expected)

B.ENG. at Department of Mechanics and Engineering Science & Wu Yuzhang Honors College (Top 3%)
<u>Major</u>**:** Mechanics
<u>Overall GPA</u>: 3.81/4 (90.03/100)
<u>Important Courses</u>**:** 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, Modern Robotics, Robotic Manipulation, Deep Learning

RESEARCH INTERESTS

My research interests are in <u>Robotic Perception</u> and <u>Manipulation</u>, <u>Deep Learning</u> and <u>Mechanics</u>. They encompass tactile sensing, contact mechanics, and dexterous manipulation. I am particularly interested in the design of tactile sensors and the application of tactile sensing to enhance robotic dexterous manipulation and surgical procedures.

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

[C.1] 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)*
International Conference on Robotics & Automation **(ICRA 2025), Accepted**

[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)**

[P.1] 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.2] 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
<u>Lab</u>**:** 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
<u>Lab</u>**:** *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
<u>Lab</u>**:** *M*anipulation *P*erception and *I*ntelligence Lab *(MPI Lab)*

RESEARCH EXPERIENCES

Tactile Perception in Surgical Procedure   May 2024 - Present
The Chinese University of Hong Kong, 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
  • Accepted by 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
  • Calibrated the sensor and realized 3D reconstruction

Simulation, Learning and Reconstruction for Vision-based Tactile Sensor   Mar 2024 - Sep 2024
Tsinghua University, Supervised by Wenbo Ding

✧ Fingertip-shaped vision-based tactile sensor
  • Generated a dataset for visuo-tactile sensor using simulation and obtained the force and displacement information of the markers
  • Predicted force distribution from the binary images of sensing elastomer using a Neural Network
  • Developed algorithms for real-time marker points tracking and 3D reconstruction
✧ Simulation for A Bimodal Visuo-tactile 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 Calibration for Visuo-Tactile Sensor (GelSlim)   Jun 2023 - Nov 2023
Shanghai Jiao Tong University, Supervised by Daolin Ma

  • Established a dataset using finite element method simulation
  • Utilized a Transformer model to learn the relationship between mechanical parameters and boundary condition
  • Demonstrated the model in a real-world experiment, achieving an error of 0.03 MPa for Young's modulus and 0.006 for Poisson's ratio

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

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 students' 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, SoildWorks, MATLAB, Ubuntu, Linux, VS Code, Gazebo, ROS
Hardware: Fabrication of Vision-based Tactile Sensor, ATI Force Sensor, UR5 robot arm
Languages: Mandarin (Native), English (Fluent)