

Haozhe Zhang

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EDUCATION

Ph.D. candidate in **Mechanical Engineering**

University of Virginia (GPA: 3.62)

08/2018 – Present (expected graduation: 04/2023)

B.S. in **Theoretical and Applied Mechanics**

University of Science and Technology of China

09/2014 – 06/2018

WORK EXPERIENCES

Packaging Engineer Intern, *Western Digital, Milpitas, CA*

05/2022 – 08/2022

- Conducted FEA with ANSYS for SSD drop tests to analyze the shock impact to NAND package and PCB. Developed experiments (DoE) based on FEA results.
- Developed failure criteria for SSD drop test by correlating test performance with simulation with machine learning models. This criterion can cut the expenditure on the SSD drop test by ~ 90%.
- Designed a method for in-situ detect crack initiation in packages/NANDs/PCBs during 3/4-point bending tests via detecting acoustic emission signals.

Research Assistant, *University of Virginia, Charlottesville, VA*

08/2018 – Present

- Designed mechanical-driven engineering materials and structures with physical functionalities.
- Developed numerical models under solid mechanics frameworks to analyze and quantitatively predicted the corresponding physical properties.
- Conducted Multiphysics FEA simulations, and comprehensive experiments, including 3D printing and mechanical testing, to test the mechanical properties and to analysis the mechanism of our designs.
- Published 4+ journal papers as first/co-first author and 6+ journal papers as co-author.

Research Assistant Intern, *University of Colorado, Boulder, Boulder, CO*

06/2017 – 09/2017

- Conducted crack propagation experiments of VHB gels and hydrogels with Instron and attached 1500+ glitters at the crack tip for the strain field tracing and analysis the fracture mechanics of soft materials.
- Developed a MATLAB image processing program to dynamically trace those glitters < 3% error.

RESEARCH EXPERIENCES

Mechanical Janus Structure

- Designed a new engineering structure which we called *mechanical Janus structure*. The structure can reorganize into well-ordered pattern by programing mechanical stimulations, and thus achieve mechanically controllable acoustic properties.
- Developed a numerical model under contact mechanics framework to analyze its mechanism and to quantitatively predict its mechanical and physical properties with high accuracy.
- Conducted FEA with Abaqus and COMSOL and 3D printing experiments for validation and acoustic study on elastic wave filtering.
- Trained CNNs via Pytorch with FEA data for structural stability with 88% accuracy.

Optical Devices

- Developed a mechanical model for stretchable metasurfaces, which is a category of optical materials, to analyze rotation of hard nano-antenna and the influence on its optical properties.
- Conducted FEA simulations for the stress field and rotation angle to validate our model.
- Conducted mechanical testing to test the corresponding mechanical properties.

Soft Robotics

- Designed a robot design strategy with thermal or pneumatic actuator to achieve programmable locomotion patterns controlled by one signal input. Developed a numerical model for predict.
- Validated the predication from stress fields to locomotion trajectories with various input signal from our model by FEA with Abaqus.

Printed Corneal Sensor

- Designed a smart contact lens for continuous remote assessment of ocular health and chronic diseases.
- Analyzed the reliability under various loading conditions via FEA simulation with Abaqus.

Wearable Skin Sensor

- Designed an ultra-thin thermal skin sensor with sensitivity 22 times higher than existing mental sensor for body disease diagnosis.
- Conducted FEA with Abaqus to analyze the fracture risk on various positions of human body.

SKILLS

Coding Proficiencies: MATLAB, Python (Pytorch/NumPy/panda/sqlite3), C, R-Studio, MySQL, Git, Fortran

Finite Element Analysis: Abaqus, COMSOL, ANSYS, LS-Dyna

3D Modeling: Solidworks, AutoCAD, SpaceClaim

SELECTED PUBLICATION

1. **Haozhe Zhang**, Weizhu Yang, Qingchang Liu, Yuan Gao, Zhufeng Yue, Baoxing Xu. [Mechanical Janus Structures by Soft-Hard Material Integration](#). *Advanced Materials*.
2. **Haozhe Zhang**, Baoxing Xu. [Soft-hard material integration enabled programmable robotic locomotion](#). *Applied Physics Letters* 121(2022)214104
3. Kyunghun Kim#, Ho Joong Kim#, **Haozhe Zhang**#, Woohyun Park, Dawn Meyer, Min Ku Kim, Bongjoong Kim, Heun Park, Baoxing Xu, Pete Kollbaum, Bryan W Boudouris, Chi Hwan Lee. [All-printed stretchable corneal sensor on soft contact lenses for noninvasive and painless ocular electrodiagnosis](#). *Nature Communications* 12 (2021) 1544 (# Equal contribution)
4. **Haozhe Zhang**, Weizhu Yang, Baoxing Xu. [Rotation Mechanics of Optical Scatters in Stretchable Metasurfaces](#). *International Journal of Solids and Structures*. 191-192(2020)566-576
5. Mingyu Sang, Kyowon Kang, Yue Zhang, **Haozhe Zhang**, Kiho Kim, Myeongki Cho, Jongwoon Shin, Jung-Hoon Hong, Taemin Kim, Shin Kyu Lee, Woon-Hong Yeo, Jung Woo Lee, Taeyoon Lee, Baoxing Xu and Ki Jun Yu. [Ultra-high Sensitive Au-doped Silicon Nanomembrane Based Wearable Sensor Arrays for Continuous Skin Temperature Monitoring with High Precision](#). *Advanced Materials*. 34(2022)2105865
6. Yuan Gao, Mingzhe Li, **Haozhe Zhang**, Yue Zhang, Weiyi Lu, Baoxing Xu. [Anomalous solid-like necking of confined water outflow in hydrophobic nanopores](#). *Matter*. 5(2022)266-280