Junhao Zhang

Email: junhzhang@student.ethz.ch
Mobile: +41 79-786-58-89

Education

- **ETH Zurich** — Zurich, Switzerland
  Master of Science - Mechanical and Process Engineering — *Sep 2021 - Present*
  Courses: *Biomedical imaging, Biosensors, Optics, Biophysics, Computer Vision, Machine Learning*
- **University of California, Santa Barbara** — California, USA
  Bachelor of Science - Physics & Bachelor of Science - Mechanical Engineering — *Sep 2017 - June 2021*
  Courses: *Optics, Control system, Electronics, Mechanical Design, Fluid Dynamics*

Skills Summary

- **Programming Languages**: Python, C#, C++, HTML/CSS/JS
- **Software**: Matlab, LabView, Unity, SolidWorks, Rhino, 3D Slicer
- **Platforms**: Linux, Windows, Arduino, Raspberry

Experience

- **The Multi-scale Functional and Molecular Imaging Group** — Zurich, Switzerland
  Research assistant — *Sep 2021 - Present*
  - Established the feasibility of human brain photoacoustic tomography and optimize the algorithm for image processing.
  - Fabricated brain phantom with 3D printing and ultrasonic gel. Characterized its optical and acoustic properties.
  - Designed an automatic pipeline to calculate the skull thickness and scalp-to-cortex distance from MRI.
  - Implemented deep learning models to segment mouse brain from 3D optoacoustic images and register them to MRI scans.
- **Augmedit & University Hospital of Zurich** — Zurich, Switzerland
  Intern software developer — *Feb 2022 - Present*
  - Explored the feasibility of neuronavigation based on mixed-reality technologies.
  - Implemented registration algorithm from scanned point cloud to MRI mesh for real intracranial neurosurgeries in the OR.
  - Communicated with surgeons in each field test to improve the solution.
- **Institute for Collaborative Biotechnologies** — California, USA
  Intern specialist — *06/2019 - 10/2019*
  - Participated in interdisciplinary bio-related research with different teams, and designed solutions for microfluidic research.
  - Designed and tested control system and imaging system to monitor biological experiment environment for scientific research.
  - Helped with data logging, device maintenance, and meeting organizing.

Projects

- **Patient Registration with HoloLens**: Developed an automatic registration method that uses the sensors of the HoloLens to scan the surface of a patients and create a mesh. Then the mesh is matched on the mesh of the virtual model from the MRI/CT scans using rigid point-based algorithm. (Feb 2022 - present, Augmedit, Netherlands)
- **Senior Capstone project (shape memory alloys team)**: Designed and constructed an autonomous deployment of a solar panel using elastic origami mechanism and shape memory alloys as thermal actuators, featuring a high solar energy input and simple actuation. Constructed robust passive control of the system, and built the communication module of the system in the team. (Sep 2020 - June 2021, UCSB, USA)
- **Water Impact project**: Investigated the impact force and splash evolution of AUV entering the water as a function of geometry using particle image velocimetry and a series of sensors. Proposed new approaches featuring a smooth development of splash and low pressure profile, including the design of the whole mechanical system, the construction of the sensing system, and data analysis. (Fed 2020 - Mar 2021, UCSB, USA)

Publications

- Zhang, J., Dean-Ben, X.L., Ni, R., *et al.* Evaluation of Transcranial Optoacoustic Imaging of a Human Brain Phantom. Biophotonics Congress 2022, Florida, United States.
  https://www.optica.org/events/congress/biophotonics_congress_biomedical_optics/e-posters/poster/?id=3756931

Honors and Awards

- Dean's Honor in the College of Engineering - June, 2021
- Outstanding Innovation Award for capstone project ($1500 scholarship) - June, 2021
- Academic High Honors Award - June, 2020