Shengyang Zhuang

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EDUCATION

Harbin Institute of Technology (HIT) - School of Astronautics **08 2019 – 06 2023**
B. Eng. in Automation - GPA - 91.28/100 *Harbin, China*

Core Courses: Calculus(100), Linear Algebra and Analytic Geometry(97), College Physics(98), C++ Programming(96), Theory of Automatic Control(94.7), Automatic Control Practice(92.8), Digital Electronic Experiments(95), System Modeling and Simulation(88), Analog Electronic Experiments(91), Circuit Experiment(93), Complex Function and Integral Transformation(92), Engineering Training(100)

ETH Zürich - D-MAVT, Institute of Robotics and Intelligent Systems **06 2022 – 05 2023**
Invited visiting student GPA - 5.8/6.0 (bachelor thesis: 6.0/6.0) *Zürich, Switzerland*

Courses: Microrobotics, Acoustics in Fluid Media: From Robotics to Additive Manufacturing

KTH Royal Institute of Technology - School of EECS **01 2022 – 06 2022**
Exchange student - GPA - 4.4/5.0 *Stockholm, Sweden*

Master level courses: Hybrid and Embedded Control Systems, Control Theory and Practice Advanced Course, Time Series Analysis

WORK EXPERIENCES

Acoustic Robotics Systems Laboratory, IRIS, D-MAVT, ETH Zürich **06 2022 – 05 2023**
Research student/Bachelor's Thesis Student – Supervisor: Prof. Daniel Ahmed *Rüschlikon, Switzerland*

- Exploring and innovating external field (acoustics, magnetics) based volumetric 3D printing with applications in tissue engineering, robotics and artificial intelligence (computer vision).

School of Physics, HIT **09 2021 – 12 2021**
Teaching Assistant – Supervisor: Prof. Jun Li *Harbin, China*

- Compiled the book "Mathematical Principles in College Physics". Lectured in the course of 100+ students.

United Nations ITCILO, Global Youth Leadership Academy | Certificate **06 2021 – 08 2021**
Visiting Fellow – Collaborator: Dr. Liangrong Zu *online*

- Coached 500+ global students. Edited/published 20+ curriculum reviews and promotional videos on official website. Chief planner and director of the Closing Ceremony.

Research Institute of Intelligent Control and Systems, HIT **10 2020 – 06 2021**
Research Assistant – Supervisor: Prof. Huijun Gao, Prof. Zhan Li *Harbin, China*

- Implemented new technologies in precision medicine by developing micromanipulation robotics systems. Spearheaded a new research to design an UAV for medicine delivery during covid-19 pandemics.

State Key Laboratory of Robotics and Systems, HIT **10 2019 – 06 2020**
Research Assistant – Supervisor: Prof. Liang Ding *Harbin, China*

- Built various robotics models for space exploration. Performed mechanical analysis to evaluate the design.

PUBLICATIONS

[1] P. Agrawal, **S. Zhuang**, S. Dreher, D. Ahmed, SonoPrint: Acoustically-Assisted Volumetric 3D Printing, *PNAS* (*under review, 2023*).

[2] **S. Zhuang**, J. Yin, J. Li, A Novel Approach for Exploring the Light Traveling Path in the Medium with a Spherically Symmetric Refractive Index, Preprint at *arXiv* https://arxiv.org/abs/2212.02642.

[3] J. Li, C. Qian, **S. Zhuang**, J. Yin, Mathematical Analysis in College Physics, 243 pages, 2022. (*book chapters, to be published*).

PROJECTS

- **Volumetric 3D Printer with Computer Vision Feedback Optimization** **10 2022 – present**

To further improve the fidelity of the printed parts compared with the digital model, a computer vision based closed-loop control system was integrated into the volumetric 3D printer.

- **SonoPrint: Acoustically-Assisted Volumetric 3D (Bio)printing** **06 2022 – 11 2022**

Piezoelectric transducers setup were used to arrange micro particles inside the ink. Different structures with acoustically aligned beads were created using volumetric printing method, which lays a foundation for organ printing.

- **Implementation of the Pre-defined Behaviors of Differential-drive Robot** **01 2022 – 03 2022**

The goal was to control a differential-drive robot to make it follow a pre-defined behavior in the workspace. Robot kinematics modeling, hybrid controller was designed based on simulator and real world environment.

- **Intelligent Micromanipulation Robotics Systems: Zebrafish Object Positioning** **07 2021 – 08 2021**

Robotics Micromanipulation Systems was an emerging technology aimed at achieving drug screening through precise microinjection of cells. OpenCV and image processing method were used to realize object positioning of zebrafish.

- **Autonomous Navigation Intelligent Delivery Drone** **09 2020 – 06 2021**

A medium-size intelligent autonomous drone was designed to achieve drug delivery during pandemic. The cargo compartment was designed to realize delivery function and SLAM was used to implement autonomous navigation. The modeling of mechanical manipulator was done through Soliworks aimed at constructing moon camps in the future. Simulations including stress analysis, explosive view and dynamics animation were performed.

TECHNICAL SKILLS

Programming: Matlab/Simulink, Python, R, C++, Verilog, LaTeX, HTML, Arduino
Modeling&Simulation: Mathematica, Solidworks, Vivado, OrCAD/Multisim, COMSOL Multiphysics
Media Design: Premiere Pro, After Effects, Media Encoder, Illustrator, Photoshop

HONORS and AWARDS

- **Top Ten Outstanding Graduates of Harbin Institute of Technology** (**Top 0.01%**) **12 2021**
- Qiming China Astronautics Foundation Scholarship (Top 3%) **10 2021**
- Merit Student Model of Harbin Institute of Technology (Top 5%) **05 2021**
- Outstanding Contribution Award in Global Youth Leadership Academy of UN ITCILO (Top 5%) **01 2021**
- First prize of National College Students' Mathematical Modeling Competition in Heilongjiang Province **12 2020**
- First prize of The 12th National College Students' Mathematics Competition **10 2020**
- First prize of 613 Institute of China Astronautics Science and Technology Corporation Scholarship (2%) **10 2020**
- Merit Student Leader Model of Harbin Institute of Technology (Top 5%) **05 2020**
- First-class Scholarship of Harbin Institute of Technology (Top 3%) **04 2020**

VOLUNTEERING

- **Lecturer** in BaiSiTang Distinguished Student Group of Harbin Institute of Technology **10 2019 – 08 2020**
- **Volunteer Teacher** in online support education at Luoning No. 1 High school **06 2020 – 06 2021**

ABOUT ME

I am a **robotics enthusiast** who is passionate about creating all kinds of intelligent robots and bringing innovations to solve real world problems. My research interest lies at the intersection of **control and optimization, robotics, volumetric printing, computer vision approaches** and their applications in intelligent autonomous systems (e.g. autonomous vehicles), life sciences and healthcare (e.g. medical robots).
Apart from study and research, I was a **member of college basketball and football team** and the **core runner** in 4×100 relay at HIT track meet 2019. I am also a **saxophone** hobbyist actively performing in all levels of play. I am also a "YouTuber" (Chinese version bilibili) with around 200 fans.

▶ Control Theory ▶ Robotics ▶ Artificial Intelligence ▶ Acousto-(Micro)robotics ▶ Volumetric 3D Printing

LANGUAGES

- Chinese(native), Hokkien(native), English(IELTS - C1), German(beginner)