Shengyang Zhuang

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Education

Master of Research, Medical Robotics, Imperial College London, UK 09 2023 – 09 2024
With full scholarships: Recipient of Chiang Chen Overseas Fellowship 2023/2024[1] and Hamlyn bursary[2].
MRes thesis: "Mlti-robot system prototyping for cooperative control in robotic surgery".
Supervisor: Prof. Ferdinando Rodriguez y Baena, at The Mechatronics in Medicine Laboratory.

Bachelor of Engineering, Automation, Harbin Institute of Technology, China 08 2019 – 06 2023
Weighted Grade: 91.28/100 (154 credits). With highest honor: Top Ten Outstanding Graduates[3].
Prev.: Less than Top 1% in Gaokao (China's college entrance exam) among 200,000 students.

Invited visiting student, ETH Zurich, Switzerland 06 2022 – 05 2023
Weighted Grade: 5.8/6.0 (48 ECTS). Bachelor's thesis (grade: 6.0/6.0): "SonoPrint: acoustically-assisted volumetric 3D printing with feedback optimization." Supervisor: Prof. Daniel Ahmed at Acoustic Robotics Systems Lab.

Exchange student, KTH Royal Institute of Technology, Sweden 01 2022 – 05 2022
Weighted Grade: 4.4/5.0 (30 ECTS). Took master courses regarding advanced control theory, embedded control systems and time series analysis.

Experience

Research postgraduate, Imperial College London, UK 09 2023 – 09 2024
- Working on an individual project (8 months) about "Multi-robot system prototyping for cooperative control in robotic surgery". Using ROS and machine learning. Supervised by Prof. Ferdinando Rodriguez y Baena.
- Studying robotics, computer vision, and machine learning. Research training at the Hamlyn Centre.
- Worked on a group project about "Soft Optical Tactile Sensor to Localise and Assess Colorectal Tumours". Using deep learning and computer vision methods. Group leader of five, supervised by Dr. James Avery and Dr. Alex Thompson.

Bachelor's thesis student, ETH Zurich, Switzerland 06 2022 – 05 2023
- Worked on bachelor's thesis at Acoustic Robotics Systems Lab supervised by Prof. Daniel Ahmed.
- Explored acoustically assisted volumetric 3D printing (V3D) technology with feedback optimization through hands-on laboratory work and simulation.
- Developed V3D software with full functionalities: 3D reconstruction, image processing, motor control, etc.

Teaching assistant, Harbin Institute of Technology, China 08 2021 – 12 2021
- Assisted Prof. Jun Li in the course "Mathematical principles in college physics".
- Compiled three chapters of the handouts and lecture slices. Lectured for 50+ students.

Visiting fellow, Global Youth Leadership Academy at UN ITCILO, remotely 06 2021 – 08 2021
- Worked with former UN senior official Dr. Liangrong Zu.
- Coached 500+ global students. Produced program videos. Chief planner and director of the closing ceremony.

Publications

[1] P. Agrawal, **S. Zhuang**, S. Dreher, S. Mitter, D. Ahmed, SonoPrint: Acoustically-Assisted Volumetric 3D Printing for Composites, Preprint at bioRXiv https://doi.org/10.1101/2023.08.07.552292. (under review *Advanced Materials*).

Scholarships and Awards

- Chiang Chen Overseas Fellowship 2023/2024, $50,000. 07 2023
- Hamlyn Bursary, £3,000. 06 2023
- Qiming scholarship of HIT, awarded for Top 10% marks in the year, ¥7,000. 10 2021
- First Prize National Mathematical Modeling Competition, provincial 10 2021
- Top Ten Outstanding Graduates of HIT, ¥10,000. 12 2021
- 613 scholarship of HIT, awarded for Top 5% marks in the year, ¥8,000. 10 2020
- First Prize National Mathematics Competition, provincial. 10 2020

Skills

- **Interest**: Machine learning/Deep learning/Reinforcement learning, Robotics, Computer vision, Control theory
- **Computing**: Matlab, Python, C++, Arduino, Raspberry Pi, LaTeX.
- **Design**: Solidworks, ImageJ, HTML web design, Adobe Photoshop/ Premiere Pro/ After Effect video editing.
- **Sports and music**: Surfing, Skiing, Saxophone (since 2012).
- **Languages**: Mandarin Chinese (native), Hokkien (native), English (professional), German (limited)

Selected Projects

Soft Optical Tactile Sensor to Localise and Assess Colorectal Tumours 10 2023 – 12 2023

- Designed the mechanically airtight structure for the soft optical tactile sensor. Implemented OpenCV algorithms and trained a CNN model to identify tumour location and hardness, based on dot patterns.

Software design for state-of-the-art volumetric 3D printer 03 2023 – 05 2023

- Created a user-friendly python software with all functions needed for volumetric 3D printer. This included projection control, 3D object tomographic scanning, incorporating various image optimization algorithms, etc.

SonoPrint: acoustically-assisted volumetric 3D printing with feedback 08 2022 – 03 2023

- Optimized an acoustically-assisted volumetric 3D printer with an additional visual feedback system.
- Conducted experiments regarding 3D printing, piezoelectric transducers, microscope, soldering and so on.
- Derived physical principles equations to theoretically prove experiments. The study was concluded in the supplementary information of the paper published.

Implementation of the pre-defined behaviors of differential-drive robot 01 2022 – 03 2022

- Derived robot kinematics model mathematically. Designed & optimized controllers through simulation. Conducted experiments to assess the performance.

References available on request

Prof. Daniel Ahmed, dahmed@ethz.ch, ETH Zurich, Switzerland

Assistant Professor of Acoustic Robotics for Life Sciences and Healthcare, P.I. of Acoustic Robotics Systems Lab.

Prof. Huijun Gao, hjgao@hit.edu.cn, Harbin Institute of Technology, China

Chair Professor of Control Science and Engineering, IEEE Fellow, Member of Academia Europaea, Director of Research Institute of Intelligent Control and Systems.

[1] In 2023, only 9 students in Mainland China received the Chiang Chen Overseas Fellowship, which supports top engineering graduates to pursue postgraduate studies in the Top Ten US or selected European institutions. The selection process begins with 15 leading engineering colleges in China nominating two students each. A preliminary panel narrows it down to 20 finalists, from whom normally about 11 recipients are chosen by the final panel each year.

[2] This limited scholarship is only provided to exceptional applicants who achieve academic excellence in their diploma programme. The scholarship is provided by the Hamlyn Centre and the Institute of Global Health Innovation.

[3] This annual award at HIT is given to outstanding students regardless of their academic level (bachelor, master, or PhD). Each department and Shenzhen, Weihai campus nominate only one student based on their academic achievements and activity involvement. The university committee then selects 10 finalists through a symposium presentation process.