SHENGYANG ZHUANG

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EDUCATION

Master of Research in 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: "Multi-robot system prototyping for cooperative control in robot-assisted spine surgery".
Supervisor: Prof. Ferdinando Rodriguez y Baena, at The Mechatronics in Medicine Laboratory.

Bachelor of Engineering in Automation, Harbin Institute of Technology, China   08 2019 – 06 2023
Weighted Grade (154 credits): 91.28/100. 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 (48 ECTS): 5.8/6.0 (Excellent/Ausgezeichnet). 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 (30 ECTS): 4.4/5.0. Took master courses regarding advanced control theory, embedded control systems and time series analysis.

EXPERIENCE

MRes thesis student, Imperial College London, UK   01 2024 – 09 2024
- Working on an individual project (8 months) about robotics, ROS, obstacle avoidance algorithm, cooperative control via active constraints, computer vision, and machine learning.
- Studying robotics, computer vision, and machine learning. Research training at the Hamlyn Centre.
- Prev. worked on a group project about "Soft Optical Tactile Sensor to Localise and Assess Colorectal Tumours". Using deep learning and image processing methods. Group leader of five, supervised by Dr. James Avery.

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, simulation, and programming.
- 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, Robotics, Computer vision
- **Computing**: Matlab, Python, ROS, Linux, C++, Arduino, Raspberry Pi, LaTeX.
- **Design**: Solidworks, ImageJ, HTML web design, Adobe Photoshop/ Premiere Pro/ After Effect video editing.
- **Sports and music**: Alpine skiing, Surfing, Saxophone (since 2012).
- **Languages**: Mandarin Chinese (native), Hokkien (native), English (professional), German (limited)

Selected Projects[4]

Multi-robot system prototyping for cooperative control   02 2024 - present

- KUKA iiwa7 LBR 700 eye-in-hand calibration for depth camera. Deploying trained neural network algorithm to keep sight of a moving spine target region. Exploring dual-arm cooperative control via active constraints.

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 image-processing 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.

Dr. James Avery, J.P.Avery@leeds.ac.uk, University of Leeds, UK

Lecturer (Assistant Professor) in Robotics and Embedded Computer Systems Engineering.