JIALE WANG

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EDUCATION

Hong Kong University of Science and Technology (HKUST) **Hong Kong, China**
Master of Philosophy (MPhil) in Electronic and Computer Engineering *September 2023 – July 2025 (expected)*

- GPA: 4.0 / 4.3 (Excellent Performance, **straight A's**)
- Relevant coursework: MECH5950 Introduction to Microsystems: Technology and Devices (A+, this course includes microfabrication processes such as deposition, photolithography and etching), ELEC5640 Robot Manipulation (A), ELEC5900 Modern Engineering Research Methodologies (A)
- Teaching: teaching assistant in ELEC3200 System Modeling, Analysis and Control
- **Led** lab members to conduct animal testing

Beijing University of Posts and Telecommunications (BUPT, "Project 211" University in China) **Beijing, China**
Bachelor of Engineering in Automation *September 2019 – July 2023*

- Grade: 91.37 / 100 (Comprehensive ranking: **1 / 70**)
- Selected honors:

  07/2023, Beijing Outstanding Graduate (**Highest honor for graduates**)

  06/2023, Outstanding Undergraduate Thesis Award (**1 / 70 in department**)

  2019-2020 & 2020-2021, First-class Scholarship

  2019-2020 & 2020-2021, Outstanding Student
- Relevant coursework: Intelligent Robot System (II) (4.0/4.0, **highest** mark in department), Computer-controlled Simulation (3.97/4.0, **highest** mark in department), Machine Learning (3.93/4.0, **highest** mark in department)
- **Exchange programme**: University of Cambridge Online Research Assistant Programme (Excellent), Tunis University Belt and Road Exchange Programme
- Served as a Class Organization Committee Member and Head of Academic Affairs in the BUPT Student Union
- Did **oral presentation** and participated in the Q&A session in *ICRA 2022*

PUBLICATIONS (PUBLISHED OR ACCEPTED)

1. **Jiale Wang***, Chenhao Yue*, Gang Wang, et al., "Task Autonomous Medical Robot for Both Incision Stapling and Staples Removal," in *IEEE Robotics and Automation Letters*, April 2022, published. **(Ranking: Q1, 6 / 130)** [Paper] [Video]
2. **Jiale Wang**, Hao Ren, Liu Yang, et al., "Robotic Anchoring System with Two Locomotion Modes for Preoperative Localization of Colorectal Cancer," in *2024 IEEE International Conference on Robotics and Biomimetics (ROBIO)*, accepted.
3. Hao Ren*, **Jiale Wang***, Liu Yang, et al., "A Portable Wireless Spirometer Device for Long-term Pulmonary Function Monitoring and Training," in *2024 IEEE International Conference on Robotics and Biomimetics (ROBIO)*, accepted.
4. **Jiale Wang***, Chenhao Yue*, et al., "Task Autonomous Medical Robot for Both Incision Stapling and Staples Removal," in *2022 IEEE International Conference on Robotics and Automation (ICRA)*, published. **(Top conference)** [Homepage]
5. Jiyan Zhang, Yue Xue, **Jiale Wang**, and Yuan Qi, "A Parallelized Algorithm for Channel Estimation in mmWave Massive MIMO Communications," in *2022 IEEE International Conference on Computer and Communications (ICCC)*, published. [Paper]
6. Tianyang Zhao, Rongrong Qian, Yaqi Wang, Songling Zhang, and **Jiale Wang**, "Flying Like Birds: Hierarchical-Egalitarian Switching Based Control Law for Multi-UAV Systems," in *2022 Chinese Control and Decision Conference (CCDC)*, published. [Paper]

7. Jiyan Zhang, Yue Xue, Yuan Qi, and **Jiale Wang**, "The APC algorithm of solving large-scale linear systems: A generalized analysis," in *2022 International Conference on Communications and Networking in China (Chinacom)*, published. [Paper]

PUBLICATIONS (UNDER REVIEW)

1. Hao Ren*, **Jiale Wang***, Liu Yang, et al., "A Portable Wireless Spirometer Device for Long-term Pulmonary Function Monitoring and Training," in *Biosensors and Bioelectronics*, under review. **(Ranking: Q1, 3 / 152)**
2. Xiong Yang, Hao Ren, Dong Guo, Zhengrong Ling, Tieshan Zhang, Gen Li, Yifeng Tang, Haoxiang Zhao, **Jiale Wang**, Hongyuan Chang, et al., "F^3T: A soft tactile unit with 3D force and temperature mathematical decoupling ability for robots," in *Engineering*, under review. **(Ranking: Q1, 2 / 307)**

PATENTS

1. **Jiale Wang**, Han Li, and Baiquan Su. "Autonomous Electrosurgery Robot System." CN116616902A, 2023. **(Invention patent)** [EPO]
2. Yuan Qi, Rongrong Qian, Jiyan Zhang, Yue Xue, and **Jiale Wang**. "Method and Device for Sparse Signal Recovery." CN113904689A, 2022. **(Invention patent)** [EPO]

RESEARCH EXPERIENCE

Task Autonomous Medical Robot for Both Incision Stapling and Staples Removal **Project Leader**

BUPT (Department of Automation) March 2021 – May 2022

- Designed **the mechanical structure** and fabricated the prototype of the medical robot system by 3D printing.
- Analysed kinematics of the UR manipulator to control the position of the device tip accurately and programmed it using C# to automate the whole manipulating process.
- Developed **the electrical circuit** of the robot's end-effector and took charge of its **embedded programming**.
- Proposed a novel framework using **OpenCV** and **binocular vision-based methods** to detect incisions or staples and later designed a new algorithm for planning staples efficiently through mathematical methods.
- Designed and conducted extensive experiments to evaluate the performance of this robot in the real world, then processed and analysed experimental data using **MATLAB** for the manuscript.
- Wrote the manuscript by **LaTeX**, and my paper was accepted by ***IEEE RA-L and ICRA 2022***.
- Did **oral presentation** about this research and participated in the Q&A session in *ICRA 2022*.

Long-lasting Gastric Resident System for Controllable and Adjustable Drug Delivery **Project Leader**

HKUST (Department of Electronics & Computer Engineering) July 2023 – Present

- Designed a compact structure with swallowable size for the tiny drug release module and fabricated it by **SolidWorks** and stereolithography 3D printing. Moreover, I developed **a miniature structure** in this module to solve the problem of drug outlet pipe being blocked in the stomach.
- Proposed a clever design in the drug storage module to ensure that system drug release rate is not affected by its pose change, and fabricated it based on a **dip molding method**.
- Designed **a power-efficient electronic system** to enable the device to work well for 45 days, powered only by a 50mAh lithium battery.
- Implemented **Wi-Fi communication** between the system and server through embedded programming. Users can remotely adjust the drug release plan on demand.
- Developed **a user-friendly UI** that allows users to control the system not only on mobile phones but on computers.
- Conducted **ex-vivo testing** in swine stomachs to validate the system's function, and used **Origin** to visualize the data.
- **Preparing the manuscript** for submission to a top journal in biomedical engineering.
- Collaborating with the University of Hong Kong to conduct **in vivo testing**.

Next-generation Capsule Robot for Both Diagnosis and Targeted Therapy **Project Co-Leader**

HKUST (Department of Electronics & Computer Engineering) September 2023 – Present

- Designed the robot structure and fabricated its prototype independently. Moreover, inspired by heart valves, I designed a waterproof mechanism to protect microneedles before contacting tissues.
- Proposed **the microneedles fabrication process** to ensure they have good forming quality.
- Improved **the materials of microneedles** to give them both high stiffness and biodegradability.
- Conducted **ex-vivo testing** and used **histological stained sections** to evaluate the effect of microneedle.
- **Preparing the manuscript** for submission to a top journal in robotics.

A Bioelectronic Portable Wireless Spirometer for Pulmonary Function Monitoring and Training **Project Co-Leader**

HKUST (Department of Electronics & Computer Engineering) October 2023 – Present

- **Designed a compact structure** of spirometer and fabricated its prototype independently.
- Fabricated the **bio-inspired air flow sensor** in the bioelectronic device. The novel design gives the sensor anisotropic sensitivity to resist disturbances caused by eddy currents or random air turbulence.
- Implemented **Bluetooth communication** between the spirometer and the server.
- Developed an **interactive UI** to encourage patients to engage in breathing training.
- Simulated the bioelectronic device by **Finite Element Analysis** in **COMSOL**.
- Wrote the manuscript by **LaTeX**, and my paper is under review at ***Biosensors and Bioelectronics***.

Other Projects

- Robotic Anchoring System with Two Locomotion Modes for Preoperative Localization of Colorectal Cancer:
  Proposed a capsule robot system which can achieve two locomotion modes (slipping and flipping) in the stomach and anchor in the intestine for preoperative localization.

AWARDS AND HONORS

- First Prize in 10th Beijing College Student Mechanical Innovative Design Competition **(Team Leader)** 2020
  (Highest prize in this competition, awarded to students with outstanding capabilities in mechanical design.)
- Outstanding Entrepreneurial Team in Beijing College Student Entrepreneurial Team Selection 2020
  (Awarded to students with excellent capabilities in entrepreneurship.)
- First Prize in 6th Beijing College Student Engineering Design Competition **(Individual Competition)** 2021
  (Highest prize in this competition, awarded to students with rich experience in mechanical design.)
- First Prize in 6th Beijing College Student Engineering Design Competition **(Team Competition)** 2021
  (Highest prize in this competition, awarded to students with rich experience in mechanical design.)
- Outstanding Winner in 9th Beijing College Student Engineering Abilities Competition **(Team Leader)** 2021
  (Highest prize in this competition, awarded to students with excellent engineering abilities.)
- National Level Award in the Innovation and Entrepreneurship Competition 2021
  (Highest prize in this competition, awarded to students with excellent innovation abilities.)
- Excellent Conclusion in the Innovation and Entrepreneurship Competition 2021
  (Highest prize in this competition, awarded to students with excellent innovation abilities.)
- National Level Award in the Innovation and Entrepreneurship Competition 2022
  (Highest prize in this competition, awarded to students with excellent innovation abilities.)
- Second Prize in 11th Beijing College Student Mechanical Innovative Design Competition 2022
  (Awarded to students with outstanding capabilities in mechanical design.)
- Third Prize in the “Challenge Cup” Beijing College Students' Academic Science and Technology Contest 2023
  (Awarded to students with outstanding research performance.)

ADDITIONAL INFORMATION

- Programming Skills: Python, C++, C, MATLAB, PyTorch, LaTeX, Java, Linux, Git

- Specialized Software: SolidWorks, ANSYS, COMSOL, Altium Designer, Origin
- Language: Mandarin Chinese (native), English (TOEFL iBT 102 / 120) (GRE 320 / 340)