Wang Jiaqi (Oct.11, 2000)

Personal website: https://jiaqiwang-rex.github.io/

Tel: (+86) 180-8257-9727   **Email:** wjqxdu@163.com

EDUCATION BACKGROUND

XIDIAN University   Project 211   Bachelor   09/2018-07/2022
Major: Mechanical Design Manufacture and Automation   **Weighted Score** (GPA): 3.6/4.0 (rank 8%)
The Chinese University of Hong Kong, Shenzhen   Research assistant   09/2022-09/2023
Laboratory: Medical Micro Robotics Lab (focus on Medical image analysis, Micro robotics)
National University of Singapore   Master   08/2024-06/2025
Major: Biomedical Engineering

AWARDS AND HONOURS

China International "Internet+" University Students Innovation and Entrepreneurship Competition;

Third Prize of the 12th Shaanxi Province Industrial Engineering Improvement Creativity Competition;

"Honorable Mention" in Mathematical Contest in Modeling;

Second Prize of National College Students Mathematical Contest in Modeling in Shaanxi Province;

Outstanding Student of XIDIAN University in three years (Top 5%);

First Prize of Mechanical Innovation Design Competition in Shaanxi Province (Top 5%);

Outstanding Graduates of XIDIAN University (Top 5%);

PUBLICATIONS

[1] Jiang A, **Wang J**, Zhao H, et al. Identifying Viability of Immotile Sperm at One Glance: Sperm Viability Classifier Powered by Deep Learning. *Fertility and Sterility*, 2022;

[2] **Wang J**, Chen J, Zhang Z. Estimating End-Effector 3D Position using a Single Monocular Microscopic Image for Robotic Micromanipulation. *IEEE International Conference on Robotics and Biomimetics*, 2022;

[3] Chen J, **Wang J**, Zhang Z. Estimating Z-position of Motile Cells for Robotic Cell Manipulation. *IEEE Cyborg and Bionic Systems*, 2022;

[4] **Wang J**, Chen J, Wang C, Zhang Z. Machine Learning-based Depth Prediction of End-Effector for 3D Robotic Micromanipulation. *IEEE Cyborg and Bionic Systems*, 2022;

[5] **Wang J**, Jiang A, Chen W, et al. Testing The Reproducibility and Effectiveness of Deep Learning Models among Clinics: Deep Learning-Based Sperm Counting as a Pilot Study, *Reproductive Biology and Endocrinology,* 2024; (Under revision)

[6] Jiang A, Hao M, Li Y, **Wang J**, et al. Automated Point-of-Care Semen Analysis Using Smartphone Imaging and Occlusion-Aware Multi-Object Tracking. IEEE Transactions on Automation Science and Engineering, 2024;

[7] Dai W, Liu R, **Wang J**, et al; Automated Non-invasive Analysis of Multiple Sperms Using Cross-scale Guided Network. IEEE International Conference on Robotics and Automation, 2024.

RESEARCH AND PROJECT EXPERIENCES

Research 1: *Sperm Viability Classifier Powered by Deep Learning*   01/2022-04/2022

➤ This study aims to test the hypothesis and to develop an AI-based technique to non-invasively predict the viability of immotile sperm using a single brightfield image, without requiring sample processing.

➤ The developed AI model for the first time enables the non-invasive prediction of sperm viability using a single image. The AI model is able capture subtle morphological changes in sperm nucleus that humans may not be able to reveal. The technique could be applied in various scenarios, from infertility diagnosis to IVF treatment. For instance, the technique can be used as an add-on module to current CASA systems to provide instant sperm viability information without tedious staining procedures.

➢ **Video Presentation Award-Second Place** in ASRM 2022 Scientific Congress & Expo (Second author)

Research 2: *Estimating End-Effector 3D Position using a Single Monocular Microscopic Image for Robotic Micromanipulation* 08/2022-06/2023

➢ A new strategy is proposed to estimate the z-axis position of the end-effector. Instead of using depth-from-focus and depth-from-defocus methods, we transform z-axis positioning problem into a multiclass classification problem.
➢ Our strategy takes a monocular image of the end-effector as input, classifies it into different depth intervals, and outputs the focal plane z-axis position for that interval. A deep learning model is developed to solve the multiclass classification problem.
➢ **Accepted** by the 2022 IEEE International Conference on Robotics and Biomimetics. (First author)

Research 3: *Testing The Reproducibility and Effectiveness of Deep Learning Models among Clinics: Deep Learning-Based Sperm Counting as a Pilot Study* 09/2020-08/2023

➢ There is an alarm about "brewing reproducibility crisis" in machine-learning-based sciences in medical field.
➢ Aiming to test the reproducibility of a machine learning model, here we performed a prospective multicenter clinical validation study. We used sperm counting as a pilot study to test reproducibility of the model among different clinics under different clinical setups.
➢ This work performed reproducibility analysis of the developed machine learning model, and quantified, for the first time, model intraclass correlation coefficient (ICC).
➢ **Under review** in *NPJ digital medicine* (First author)

Project 1: *Big Data Analysis of Shield Machine's Error Correction* 10/2019-10/2021

➢ Exploit machine production parameters to predict the quality of products to achieve immediate and comprehensive production results, and conduct more precise process inspections;
➢ Use the Recursive Feature Elimination (RFE) model to score features and extract features with relatively high importance;
➢ Make use of random forest algorithm and support vector regression machine algorithm to establish a product quality prediction model.

Project 2: *Somatosensory Wearable Mechanical Gloves* 01/2020-11/2020

➢ To help the elderly people with weak hands pick up heavy objects;
➢ Responsible for mechanical structure design and 3D modeling, motion simulation and stress analysis; used laser cutting and 3D printing for model making;
➢ Comparing with existing domestic products with the same function, our product is more lighter and easy to wear and operate.

OTHER SKILLS

Hardware: Fluent utilization of various imaging modes in microscopy

Software: Master user of Python, MATLAB and SolidWorks

Design: Proficiency in Microsoft Suite including Word, Power Point, Latex and other office software; adept in producing catchy slides; skilled at scientific research drawing

Technology Development: Strong project development capabilities and can independently carry out program unit design and development, source code writing, and functional testing

Project Management: Sufficient teamwork and project management skills, experienced in project management software, and strong innovation-driven capabilities