Dr Fan Zhang

Contact Information

Honda Research Institute EU   Email: fan.zhang@honda-ri.de

Frankfurt, Germany   www: fan6zh.github.io

Research Interests

General Robot Manipulation, Sim-to-Real Learning, Self-Supervised Learning, Vision-Language-Action Model, Flow Matching

Professional Appointments

Senior Research Scientist & Project Leader, 2024-present

Honda Research Institute EU

Eric and Wendy Schmidt AI in Science Postdoctoral Fellow, 2023-2024

Schmidt Futures, Imperial College London

Visiting Researcher, 2024-present

Research Associate, 2021-2023

Imperial College London (UK Global Talent Visa, sponsored by Royal Academy of Engineering)

Education

Ph.D. in Electrical and Electronic Engineering (Robotics), 2016-2020

Imperial College London

Thesis**:** Perception and Manipulation in Robotic-Assisted Dressing

Supervisor: Prof. Yiannis Demiris

Awards

Best Research Paper (ECR), AI & Robotics Research Awards, held by TAS Hub, Responsible Ai UK, and the Royal Society   2025

The UK Best PhD in Robotics Award 1st place, held by Queen Mary   2020

Best Student Paper Award, ICMA   2016

Highlighted Publications

Affordance-based Manipulation with Flow Matching

Fan Zhang, Michael Gienger.

arXiv, 2025. (paper, website, code, Hugging Face LeRobot in progress)

Learning Garment Manipulation Policies towards Robot-Assisted Dressing

Fan Zhang, Yiannis Demiris.

Science Robotics, 2022. (paper, video, website, code)

Probabilistic Real-Time User Posture Tracking for Personalized Robot-Assisted Dressing

Fan Zhang, Antone Cully, Yiannis Demiris.

IEEE Transactions on Robotics, 2019. (paper, video)

Contrastive Self-Supervised Learning for Automated Multi-Modal Dance Performance Assessment

Yun Zhong, Fan Zhang, Yiannis Demiris

ICASSP, 2023. (paper, video, code)

—— Selected Publications

Composition of Conditional Diffusion Policies with Guided Sampling
Amirreza Razmjoo, Sylvain Calinon, Michael Gienger, and Fan Zhang
IROS 2025. (paper, website, under review)

Visual-Tactile Learning of Garment Unfolding for Robot-Assisted Dressing
Fan Zhang, Yiannis Demiris.
RA-L, 2023. (paper, video)

Learning Grasping Points for Garment Manipulation in Robot-Assisted Dressing
Fan Zhang, Yiannis Demiris.
ICRA, 2020. (paper, video)

Personalized Robot-Assisted Dressing using User Modeling in Latent Spaces
Fan Zhang, Antone Cully, Yiannis Demiris.
IROS, 2017. (paper, video)

Preoperative Planning for the Multi-Arm Surgical Robot using PSO-GP-based Performance Optimization
Fan Zhang, Zhiyan Yuan, Zhijiang Du.
ICRA, 2017. (paper)

Preoperative Setup Planning for Robotic Surgery Based on a Simulation Platform and Gaussian Process
Fan Zhang, Zhiyan Yuan, Zhijiang Du.
IEEE International Conference on Mechatronics and Automation (ICMA), 2016. (paper)
Best Student Paper Award

An Under-Actuated Manipulation Controller Based on Workspace Analysis and Gaussian Processes
Fan Zhang, Yanyu Su, Wei Dong, Zhijiang Du.
IROS, 2015. (paper, video)

—— Talks

IROS Workshop on Deformable Object Manipulation	2025
Autonomous Agents Research Group Seminar, the University of Edinburgh	2025
Guest Lecture, TAMS, University of Hamburg	2024
Social AI & Robotics Laboratory, King's College London	2023
AI seminar in Statistics, Imperial College London	2023
Tsinghua University, (live audience: 150,000)	2022
Apple Weekly Seminar	2022
Human Motion Analysis for Healthcare Applications, IET (video)	2019
The Hamlyn Centre, Imperial College London	2017

—— In the Press

Robotic nurse can dress a mannequin in a hospital gown, New Scientist	2022
Baxter the nursebot to help care for ageing population, The Times	2019
Robotic nurse that helps you dress could aid staff shortage, Bloomberg	2019

Others: Daily Mail, Telegraph, IndustryWeek, TexhXplore, Generative AI

—— Technical Skills

Python, ROS, Linux, Isaac Sim, Bullet, PyTorch, 3D Printing, Autodesk Fusion 360, Maya, Blender

─── **Projects**

Closed-Loop Multisensory Brain-Computer Interface for Enhanced Decision Accuracy	2022
UKRI Trustworthy Autonomous Systems Node in Trust	2021
Innovate UK D-RISK: Learning Edge Cases for Autonomous Vehicles	2021

─── **Academic Activities**

RSS 2024 Workshop: Learning for Assistive Robotics	Organizer
Imperial-X Breaking Topics in AI conference, Schmidt Futures	Organizer
ICRA 2023 Workshop: Emerging Paradigms for Assistive Robotic Manipulation	Organizer
Frontiers in Robotics and AI-Robot Learning and Evolution	Review Editor
Scientific Reports, T-RO, ICRA, IROS, RA-L, RSS, WACV	Reviewer

─── **Research Mentorship**

Leonard Hinckeldey (The University of Edinburgh, Multi-Agent RL)	2025-present
Jenny Fu (Cornell University, Robot Character Learning)	2024-2025
Amirreza Razmjoo (EPFL, Robot Failure Recovery)	2024-2025
Nikki Zhong (Imperial college London, Human Motion Modeling)	2022-2024

─── **Highlighted Research Projects**

---- **Vision-Language-Action for Robot Manipulation with Flow Matching**

- Parameter-efficient learning manipulation affordance with vision-language foundational models using prompt tuning.
- Generative learning for robot manipulation with special focus on flow matching.
- Imitation learning and offline reinforcement learning with flow matching policy.
- Robot failure recovery with Compositional Diffusion Models.
- Large dataset collection with teleoperation for robot tasks with human in the loop.
- The flow matching policy is in the process of integrating to the Hugging Face LeRobot.

---- **Robot-Assisted Dressing for Bedridden Patients**

- Deformable object manipulation using deep Q learning from demonstration.
- Multi-modal (visual-tactile) fusion for garment unfolding using model-based reinforcement learning.
- Sim-to-real garment physics learning and robot manipulation policy transfer in physics domain using self-supervised learning.
- Building large real and synthetic dataset of garment, including RGB-D, event images and pointcloud.
- Contrastive learning for human motion modeling, including personalized user impairments modeling and dancing performance assessment.
- Real-time user posture tracking using vision and haptic information with a probabilistic particle filter.
- The above works have been published in top journals and conferences: Science Robotics, IEEE Transactions on Robotics, RA-L, ICRA, IROS, ICASSP.
- The Science Robotics paper has been selected as the Best Research Paper, Early Career Researcher, AI & Robotics Research Awards, held by TAS Hub, Responsible Ai UK, and the Royal Society.
- Based on above works, I have been awarded the UK Best PhD in Robotics Award 2020 1st place.
- The above works have been covered by several news outlets, including The Times, Bloomberg, Daily Mail, Telegraph, TexhXplore, New Scientist, etc. Live demo for NHS, ABB, Apple, MURI, etc.