

# Zhen Deng

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## EMPLOYMENT

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### **Fuzhou University**

*Associate professor*

*Fuzhou, China*

*2020.04-present*

- Member of Department of Mechanical Engineering and Automation
- Member of Fujian Intelligent Medical Engineering Joint Engineering Center
- Teaching: "Advanced Robotics", "dexterous grasping planning"

### **Shenzhen Institute of Advanced Technology**

*Research assistant*

*Shen zhen, China*

*2014.02-2015.06*

- Participated in the development of the spinal surgery robot
- Worked on the safety control of vertebral lamina milling for Spinal Surgical Robot
- Some key technical issues of vertebral lamina milling were investigated

## EDUCATION

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### **University of Hamburg(UHH)**

P.h.D in Computer science

Department of informatics

Research directions: Dexterous grasping and manipulation, Robot learning

Dissertation title: *Integrating Perception and Optimization for Dexterous Grasping and Manipulation*

*Hamburg, Gemany*

*2015.09-2019.12*

### **Harbin Institute of Technology(HIT)**

Master in Mechatronic Engineering

School of Mechanical Engineering

Research directions: Surgical robot, safety control

Dissertation title: *Bio-mechanical Modeling and Robotic Safety Control for Spinal Surgery*

*Shen zhen, China*

*2011.09-2014.01*

### **Shaoyang University**

Bachelor in Mechatronic Engineering

Department of Mechanical design and manufacturing and automation

*Hunan, China*

*2007.09-2011.07*

## RESEARCH INTERESTS

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Robotic grasping and manipulation, Imitation RL, Medical Robot

## ACADEMIC ACHIEVEMENTS

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- 2016 IEEE ROBOTICS AND AUTOMATION BEST PAPER AWARD
- 2014 Award for Excellent/Outstanding Employee' of Shenzhen Institute of Advanced Technology, China
- 2014 'Excellent graduate student' and 'excellent graduate' of Harbin Institute of Technology, China

## PROJECTS

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### **Cross-modal Learning: Adaptivity, Prediction and Interaction**

*TRR169, DFG-NSFC*

*Research Associate/Participant*

2016-2020

- Worked on B5 sub-project "Crossmodal fusion for dexterous manipulation in proactive human-robot collaboration"
- Developed learning algorithm for dexterous grasping and manipulation

### **Spatial-temporal information processing for collision detection in dynamic environments**

*Horizon2020, EU program*

*Research Associate/Participant*

2015-2019

- Proposes a visual analysis system for collision detection in dynamic environments

### **Micro-motion sensor system and real-time force perception control of spinal surgical robots**

*National Natural Science Foundation of China, 61175124*

*Research assistant/Participant*

2012-2015

- Developed fuzzy force control strategies and state detection methods for surgical operation

### **Active follow-up motion planning and safety control of Endoscopic surgery assisted robots**

*National Natural Science Foundation of China, 61473278*

*Research assistant/Participant*

2015-2018

- Performed signal process and safety control of the surgical robot

## PUBLICATIONS

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1. **Zhen Deng**, et al. "An adaptive planning framework for dexterous robotic grasping with grasp type detection." *Robotics and Autonomous Systems* 140 (2021): 103727.
2. He, Yucheng, Zhen Deng, and Jianwei Zhang. "Design and voice-based control of a nasal endoscopic surgical robot." *CAAI Transactions on Intelligence Technology* 6.1 (2021): 123-131.
3. **Zhen Deng**, and Jian Wei Zhang. "Learning synergies based in-hand manipulation with reward shaping." *CAAI Transactions on Intelligence Technology* 5.3 (2020): 141-149.
4. **Zhen Deng**, et al. "Grasping force control of multi-fingered robotic hands through tactile sensing for object stabilization." *Sensors* 20.4 (2020): 1050.
5. **Zhen, Deng**, Ge Gao, Simone Frintrop, Fuchun Sun, Changshui Zhang, and Jianwei Zhang. "Attention based visual analysis for fast grasp planning with a multi-fingered robotic hand." *Frontiers in neurorobotics* 13 (2019): 60.
6. **Zhen, Deng**, Haiyang Jin, Ying Hu, Yuchen He, Peng Zhang, Wei Tian, Jianwei Zhang. Fuzzy force control and state detection in vertebral lamina milling. *Mechatronics*, 2016, 35: 1-10.
7. **Zhen, Deng**, Xiaoxiang Zheng, Liwei Zhang, Jianwei Zhang. A learning framework for semantic reach-to-grasp tasks integrating machine learning and optimization. *Robotics and Autonomous Systems*, 108, 140-152, 2018.
8. **Zhen, Deng**, Haojun Guan, Rui Huang, Hongzhuo Liang, Liwei Zhang and Jianwei Zhang "Combining Model-based Q-learning with Structural Knowledge Transfer for Robot Skill Learning", *IEEE Transactions on Cognitive and Developmental Systems*, PP(99):1-1, June 2017.
9. Yan, Wenyu, **Zhen, Deng**, Jinbao Chen, Hong Nie, and Jianwei Zhang. "Precision Grasp Planning for Multi-Finger Hand to Grasp Unknown Objects." *Robotica* 37, no. 8 (2019): 1415-1437.

10. Mi, Jinpeng, Song Tang, **Zhen, Deng**, Michael Goerner, and Jianwei Zhang. "Object affordance based multimodal fusion for natural Human-Robot interaction." *Cognitive Systems Research* 54 (2019): 128-137.
11. Han, Dong, Hong Nie, Jinbao Chen, Meng Chen, **Zhen, Deng**, and Jianwei Zhang. "Multi-modal haptic image recognition based on deep learning." *Sensor Review* 38, no. 4 (2018): 486-493.
12. 靳海洋, **邓震**, 王宇, 张朋, RSSS-II 脊柱手术机器人系统开发及其实验研究, *集成技术*, 2016, (1) : 75-84

## **PATENT**

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1. Hu Ying, Zhang Peng, Guo Baoqiang, **Deng Zhen**, Zhang Jianwei, Jin Haiyang. Spine fixation device and its angle adjustment mechanism, invention patent, patent number: ZL201310390929.5.
2. Zhang Peng, Hu Ying, Yan Haiyang, Zhang Jianwei, Gao Peng, **Deng Zhen**. A surgical robot and its state monitoring method, invention patent, patent number: ZL201310676213.1.