

# YUNHAI HAN

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## EDUCATION BACKGROUND

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**University of California, San Diego (UCSD)**

09/2019 - present

*M.S. in Dynamics & Controls, Mechanical and Aerospace Engineering*

*GPA: 3.909/4.00*

· **Relevant Courses:** Robotics

**Yanshan University**

09/2015 - 07/2019

*B.S. in Mechatronics, Mechanical Engineering*

*GPA: 3.792/4.5, Ranking: 2<sup>nd</sup> of 594*

· **Relevant Courses:** Mechatronics

## FIELD OF INTERESTS

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Robotics Perception and Automation; Robotics Control; State Estimation;

## RESEARCH PROJECTS

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### **Auto-calibration Method for Urban Autonomous Driving Applications**

- Present a system for dynamic camera calibration based on recognition of stop signs
- Camera intrinsic parameters are tracked over time and converges to stable values within a short time
- Experimental results show improved performance for the auto-calibration
- Submitted a paper to **IEEE RA-L with ICRA** as first-author

### **Surgical Simulation Framework for Tool-Tissue Interaction**

- Propose the framework that continuously tracks the motion of manipulator and simulates the tissue deformation
- Compute the deformation energy for the control and planning task using implicit Euler energy
- Published a paper at **IROS Workshop (Cognitive Robotic Surgery)** as first author and gave a spotlight presentation

### **Real-to-Sim Registration of Deformable Soft Tissue with Position-Based Dynamics**

- Propose an online, continuous, registration method to bridge from 3D visual perception to position-based dynamics modeling of tissues
- Account for differences between the simulation and the real, live surgical scenes.
- Submitted a paper to **ICRA** as second-author

### **Numerical verification of the differential privacy for a novel moving-horizon estimator**

- Design a differential privacy test framework for distributional systems using numerical verification method
- Capable of being easily extended to other estimators for the verification of the claimed differential privacy

## PUBLICATIONS

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- Han. Y, Liu. Y, Paz. D, and Christensen. I. H, "Auto-calibration Method Using Stop Signs for Urban Autonomous Driving Applications", arXiv:2010.07441
- Han. Y, Liu. F and M. C. YIP, "A 2D Surgical Simulation Framework for Tool-Tissue Interaction", arXiv:2010.13936
- Liu. F, Li. Z, Han. Y, J Lu, F Richter and M. C. YIP, "Real-to-Sim Registration of Deformable Soft Tissue with Position-Based Dynamics for Surgical Robot Autonomy", arXiv:2011.00800

## SELECED GROUP PROJECTS

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- RoboMaster Competition

Mainly responsible for the system design of visual components(including object tracking and stereo vision) and the PID stability adjustment of the gimbal unit on the mobile tank (to prevent bumps and collisions during movement).

## AWARDS & HONORS

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### AWARDS

- 06/2016 China Undergraduate Mathematical Contest in Modelling (CUMCM) *Second Prize*
- 03/2017 Zhou Peiyuan Mechanics Competition *National Excellence Award*
- 05/2017 National Electronic Design Competition *Successful Entry Certificate*
- 09/2017 Asia-Pacific Mathematical contest in modeling (APMCM) *Second Prize*
- 01/2018 Mathematical Contest in Modeling (MCM/ICM) *Honorable Mention*
- 08/2018 RM RoboMasters *Second Prize*

### HONORS

- 11/2017 National Scholarship from Chinese Ministry of Education
- 07/2018 Certificate for Attendance of CDIO 2018 Academy (Japan)
- 06/2019 Certificate of Excellent Graduate in Hebei Province

## STANDARD TESTS

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Test Date: 24 <sup>th</sup> Mar 2018	TOEFL Score 101 (101, R30, W26, L23, S22)
Test Date: 7 <sup>th</sup> Sep 2018	GRE Score 325 (V156, Q169, W3.5)

## COMPUTER SKILLS

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Programming Language	C/C++, Python, MATLAB/Simulink, LaTeX
Embedded Development	STM32