

# JINTAN ZHANG

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📍 Baltimore, Maryland 📞 (530)-760-9657

## EDUCATION

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### Ph.D. in Computer Science

Johns Hopkins University, Baltimore, MD

Aug 2022 -

- Advisor: Dr. Peter Kazanzides and Dr. Emad Bector

### M.S.E. in Robotics

Johns Hopkins University, Baltimore, MD

Aug 2021 - May 2022

- Advisor: Dr. Peter Kazanzides

### B.S. in Electrical Engineering & Computer Science

Johns Hopkins University, Baltimore, MD

Aug 2019 - May 2021

- GPA: 3.71

### Mechanical Engineering

University of California, Davis, Davis, CA

Sep 2017 - June 2019

- GPA: 3.934

## RESEARCH EXPERIENCE

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### Learning-based Robot Dynamics Identification and External Force Estimation

Johns Hopkins University

Sep 2021 -

- Developed neural network to identify robot system dynamics (torque) and estimate external force using transformers and LSTM.
- Proposed a transfer learning approach to deploy robot system dynamics identification networks on robots of identical model at different sites.

### Volumetric Monitoring and Interventional Tool Tracking System for Vascular Access

Johns Hopkins University

Sep 2022 -

- Developed acoustic and optical simulation framework for prototyping fiber-optic needle and volumetric tracking systems.
- Designed a 3D printed prototype that integrates photoacoustics sensing elements with ultrasound probe.

### Digital Twins & Simulation Infrastructure

Johns Hopkins University

Sep 2021 -

- Developing a simulation platform for medical applications integrating ultrasound, photoacoustics, and robotics.
- Developing video streaming pipeline to display real-time simulation environment on web browser and XR HMD.
- Developed a rendering extension for an open-source robot simulation framework (AMBF) using Blender to generate photorealistic data for robot learning.
- Implemented digital twin pipeline to replicate real-world robot motion and constrain its workspace via virtual boundaries in simulation.

## Causality-Driven Robot Tool Segmentation

Johns Hopkins University

Aug 2021 - Apr 2022

- Developed learning-based methods to optimize endoscopic robot tool segmentation in extreme conditions (low brightness, smoke) using digital twins and differentiable rendering.

## FPGA Firmware for Robot Velocity Control on daVinci Research Kit

Johns Hopkins University

June 2021 - Dec 2022

- Developed firmware-based closed-loop velocity control in the actuator space.
- Implemented GUI for real-time controller tuning and performance monitoring.

## Embedded & Firmware Infrastructure on daVinci Research Kit

Johns Hopkins University

Aug 2019 - Aug 2022

- Implemented firmware-based finite impulse response filters for analog potentiometers and current signals.
- Implemented a firmware-based high-speed data collection module for buffering FPGA board signals.
- Implemented an LED feedback interface for the watchdog timer.
- Implemented a ROS bridge for real-time robot visualization.

## WORK EXPERIENCE

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### Video Software Engineering Intern

Intuitive Surgical, Inc., Sunnyvale, CA

May 2022 - Aug 2022

- Added new features for Manufacturing and New Product Introduction Team to interact with video processing FPGA boards in C++.
- Implemented applications for processing monitor calibration data in C++.

### Computer Science Tutor

University of California, Davis, Davis, CA

Jan 2019 - Aug 2019

- ECS36A: Programming & Problem Solving, ECS36B: Object-Orient Programming.

### Software Engineering Intern

Meta Insight Corporation, Shanghai, China

Aug 2018 - Sep 2018

- Applied multiprocessing and multithreading to improve cloud data processing efficiency in Python.

### Robotics Intern

ZhuFei Robotics Lover Club, Shanghai, China

July 2017 - Aug 2017

- Taught high school students basic WER Brick Robot design, programming, and video editing skills.

## PUBLICATIONS

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### Journal Articles

Yilmaz, N., **Zhang, J.**, Kazanzides, P., & Tumerdem, U. (2022). Transfer of learned dynamics between different surgical robots and operative configurations. *International Journal of Computer Assisted Radiology and Surgery (IJCARS)*. (NDI Best Paper Award: Runner-Up).

## Conference Proceedings

- Barragan, J., **Zhang, J.**, Zhou, H., Munawar, A., & Kazanzides, P. (2024). Realistic data generation for 6-dof pose estimation of surgical instruments. In *2024 IEEE International Conference on Robotics and Automation (ICRA)*. (**Under-Review**).
- Ding, H., **Zhang, J.**, Kazanzides, P., Jie Ying, W., & Mathias, U. (2022). Carts: Causality-driven robot tool segmentation from vision and kinematics data. In *2022 International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*.
- Zhang, J.**, & Kazanzides, P. (2023). Velocity controller for the da vinci research kit. In *2023 IEEE International Symposium on Medical Robotics (ISMR)*.
- Zhang, J.**, Yilmaz, N., Tumerdem, U., & Kazanzides, P. (2022). Learning based estimation of 7 dof instrument and grasping forces on the da vinci research kit. In *2022 IEEE International Symposium on Medical Robotics (ISMR)*. (**Best Paper Award**).

## Presentations

- Zhang, J.**, Lester, L., Boctor, E., & Kang, J. (2023). Sub-millimeter, volumetric tracking of beacon signal during vascular access. IEEE International Ultrasonics Symposium (IUS).
- Zhang, J.**, Lester, L., Xu, K., Boctor, E., & Kang, J. (2023). Volumetric tracking of beacon signal during vascular access: System design and optimization. Ultrasonic Imaging and Tissue Characterization (UITC).

## SKILLS

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<b>Programming:</b>	C/C++, Python, Verilog, MATLAB, CUDA
<b>Deep Learning Framework:</b>	PyTorch
<b>Simulation:</b>	Isaac Sim, K-Wave, ValoMC, Simulink
<b>Embedded System:</b>	Linux, Vivado, Vitis
<b>Robot System Design:</b>	ROS
<b>Visualization:</b>	Blender, Unity
<b>Version Control:</b>	Git

## HONORS AND AWARDS

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- **Dean's List** *Fall 2019 - Spring 2021*  
Johns Hopkins University
- **Robert A. and Denzil M. Kepner Awards** *Sep 2018*  
University of California, Davis
- **Dean's Honor List** *Fall 2017 - Spring 2019*  
University of California, Davis

## PROFESSIONAL REFERENCE

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- **Dr. Peter Kazanzides**  
Department of Computer Science, Johns Hopkins University  
Research Professor  
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- **Dr. Emad Boctor**  
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- **Dr. Jeeun Kang**

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- **Dr. Adnan Munawar**

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- **Dr. Jie Ying Wu**

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