

JINTAN ZHANG

Personal Website ✉ jzhan247@jhu.edu

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

EDUCATION

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

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 LSTM and transformers.
- 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

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

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

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

HONORS AND AWARDS

- **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

- **Dr. Peter Kazanzides**
Department of Computer Science, Johns Hopkins University
Research Professor
Baltimore, MD 21218
pkaz@jhu.edu
(410) 516-5590
- **Dr. Emad Boctor**
Laboratory for Computational Sensing and Robotics, Johns Hopkins University
Associate Research Professor
Baltimore, MD 21218
eboctor@jhu.edu
(410) 516-0740

- **Dr. Jeeun Kang**

Department of Anesthesiology and Critical Care Medicine at SOM
Laboratory for Computational Sensing and Robotics, Johns Hopkins University
Assistant Professor
Baltimore, MD 21218
jkang51@jh.edu
(410) 955-7615

- **Dr. Adnan Munawar**

Laboratory for Computational Sensing and Robotics, Johns Hopkins University
Assistant Research Scientist
Baltimore, MD 21218
amunawa2@jh.edu
(774) 232-7631

- **Dr. Jie Ying Wu**

Department of Computer Science, Vanderbilt University
Assistant Professor
Nashville, TN 37235
Jieying.wu@vanderbilt.edu
(401) 241-8160