

# Junxiang (Jim) Wang

junxiang@cmu.edu | 667-910-4102 | jimwang418.github.io

---

## EDUCATION

### Carnegie Mellon University

Doctor of Philosophy, Robotics

Pittsburgh, PA

Expected May 2029

### Johns Hopkins University

Master of Science in Engineering, Robotics

Baltimore, MD

May 2024

Bachelor of Science, Mechanical Engineering

May 2023

Second major: Applied Mathematics and Statistics

- Cumulative GPA: 3.93
- B.S. graduated with general and departmental honors
- President, Pi Tau Sigma—Honor Society for Mechanical Engineers
- Member, Tau Beta Pi—The Engineering Honor Society

## RESEARCH EXPERIENCE

### Robotic Caregiving and Human Interaction Lab

Pittsburgh, PA; Sep. 2024—Present

- Building a pipeline for bidirectional verbal human-robot communication during physically assistive scenarios (e.g. bathing, feeding), utilizing the reasoning ability of large vision-language models.
  - Given a robot's image observations of its surroundings and a planned spatial trajectory, the pipeline generates natural-language descriptions of: 1) the high-level intent of the planned motion, 2) key details on the dynamics of the motion, and 3) any desired cooperation needed from the user. These communications are generated without any task-specific knowledge and are directed to non-experts.
  - Subsequently, the user would be able to give natural-language preferences to change the robot's motion, hence achieving bidirectional communication.

### Sensing, Manipulation, and Real-Time Systems Laboratory

Baltimore, MD; Sep. 2021—May 2024

- Designed a robot-assisted PET imaging system that measures and follows small-range human head motion while the subject is engaged in natural activities such as locomotion on a treadmill.
  - Developed a robust and accurate measurement system with draw-string displacement encoders.
  - Developed controllers in C++ for reproduction of human head motion on a UR3, as well as for compensation of this motion on a UR5 guided by measurements from the string encoder system.
  - Constructed a mock PET system with laser diodes instead of positrons to validate the string encoder system's performance when applied to image reconstruction during post-processing.
- Led the development of a digital twin for the da Vinci surgical robot, to be used for virtual assistance while communication is broken during teleoperation of the surgical robot.
  - Explored different strategies for recovery when communication is restored, after the user teleoperated in a virtual, simulated twin environment during communication loss.

### Intuitive Computing Laboratory

Baltimore, MD; Sep. 2021—May 2024

- Assisted with the design of a tabletop companion robot that guides older adults through simple physical exercises while providing visual and audio feedback.
  - Designed explainable machine learning model for pose classification and feedback during exercises.
  - Configured natural, semantic robot movements for greater amiability.
- Assisted with a study that incorporates large-language models with voice assistants that surpasses traditional voice assistants in key aspects such as sustaining conversations, understanding context, and tolerating word-level errors.

## PUBLICATIONS

---

- J. Wang, J. A. Barragan, H. Ishida, J. Guo, Y.-C. Ku, and P. Kazanzides. “A digital twin for telesurgery under intermittent communication.” In *IEEE Intl. Symp. on Medical Robotics (ISMR)*, Apr. 2025.
- A. Mahmood, J. Wang, B. Yao, D. Wang, and C.-M. Huang. “User interaction patterns and breakdowns in conversing with LLM-powered voice assistants.” In *Intl. J. of Human-Computer Studies*, 103406, 2024.
- J. Wang, I. I. Iordachita, and P. Kazanzides. “Method for robotic motion compensation during PET imaging of mobile subjects.” In *IEEE/RISJ Intl. Conf. on Intelligent Robots and Systems (IROS)*, Oct. 2023.
- J. Wang, T. Wu, I. I. Iordachita, and P. Kazanzides. “Calibration and evaluation of a motion measurement system for PET imaging studies.” In *J. of Medical Robotics Research (JMRR)*, vol. 8, 2023.
- J. Wang, T. Wu, I. I. Iordachita, and P. Kazanzides. “Evaluation of a motion measurement system for PET imaging studies.” In *IEEE Intl. Symp. on Medical Robotics (ISMR)*, Apr. 2022. **Best Student Paper.**
- J. Wang, E. B. Küçüktabak, R. S. Zarrin, and Z. Erickson. “CoRI: Synthesizing Communication of Robot Intent for Physical Human-robot Interaction.” Under Review.
- A. Mahmood, J. Wang, and C.-M. Huang. “Situating understanding of older adults’ interactions with voice assistants: A month-long in-home study.” Under Review.

## TEACHING EXPERIENCE

---

### Johns Hopkins University

Baltimore, MD

Teaching Assistant

January 2022—May 2024

- Serving as a teaching assistant for various courses at JHU: Electronics and Instrumentation (S’22), Robot Sensors and Actuators (F’22), and Robot Devices, Kinematics, Dynamics, and Control (S’23-F’23).
- Responsibilities include grading, holding office hours, handling questions online, and offering in-person help on projects and lab assignments that involve robot arms, sensors, motors, and circuits.

## INDUSTRY EXPERIENCE

---

### CRRC Dalian Co. Ltd.

Dalian, China

Engineering Intern

May 2021—August 2021

- Assisted with the design of heat exchangers for high-speed electric locomotives.
- Analyzed flow properties within air-cooled and water-cooled heat exchangers with CFD analysis.
- Conducted experiments for the potential use of phase-change materials in locomotive break plate.

## HONORS AND AWARDS

---

- Best student paper, 2022 International Symposium on Medical Robotics (ISMR): awarded to the best paper presentation with student first-author at ISMR 2022.
- Honorable mention, CRA outstanding undergraduate researcher: recognizes undergraduate students who show outstanding research potential in an area of computing research.
- Charles A. Miller award: recognizes outstanding academic achievement of an undergraduate JHU student in Mechanical Engineering. (2/40)
- Dean’s List at JHU for all semesters offered.

## TECHNICAL SKILLS

---

- Software: Python, MATLAB, C/C++, ROS, Linux, SOLIDWORKS, Java, Abaqus, COMSOL