

# Hui Li

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## EDUCATION

### The University of Alabama

Ph.D. in Computer Science, GPA 3.67/4.00

Thesis: Context-Aware Grasping by a Dexterous Anthropomorphic Robotic Hand

Aug. 2025 (Expected)

Tuscaloosa, AL

### Hebei University of Science and Technology

B.S. in Electrical Engineering, GPA 3.6/4.00

Aug. 2002 – June 2006

Hebei, China

## PROFESSIONAL EXPERIENCE

### UA Robot Learning Lab – Research Assistant

June 2023 – Current

**Topic:** Task-Oriented Dexterous Grasping via Contextual Reward Machine

- Developed the **DexMobile platform**, a bimanual mobile manipulator equipped with integrated sensors and force feedback. The system includes two UR5e arms, a Schunk SVH hand, a PSYONIC Ability Hand, and a Husky UGV.
- Designed a ROS 2-based control system and a corresponding digital twin simulation environment using PyBullet for sim-to-real integration and testing.
- Implemented and trained a CRM-based reinforcement learning model for task-oriented grasping in simulation, achieving a 33.8% increase in success rate and a 68.9% reduction in task completion time.
- Transferred the model to the DexMobile platform using domain randomization, achieving an 83.3% success rate in real-world execution.

**Topic:** Grasp Intention Interpretation in Object Handover

- Developed a grasp adaptation algorithm that enables a robot to recognize and adapt to individual human grasping habits during collaborative handovers.
- Implemented and trained a grasp intention recognition model using PyTorch, achieving 87.2% accuracy on unseen data.
- Built a PyBullet simulation environment with the Sawyer robot and trained a reinforcement learning model for human-robot handovers, achieving an 82.7% success rate.

### WSU Robot Intelligence Lab – Research Assistant

Aug. 2018 – June 2023

**Topic:** Learning Task-Oriented Dexterous Grasping from Human Knowledge

- Developed a multi-class, multi-label neural network that learns grasp poses from human experience, achieving a 100% hit rate and a 98.6% top-3 match rate.
- Established a task-object grasp dataset representing human experience, including 74 unique tasks, 15 grasp topologies, and 157 3D object models—some reconstructed to match real-world counterparts.
- Designed a simulation environment and trained a reinforcement learning model to perform predicted grasp topologies, achieving an 85.6% success rate over 2,700 grasping experiments.

**Topic:** MagicHand: Context-Aware Dexterous Grasping System

- Developed the **MagicHand platform**, a context-aware dexterous grasping system that collects relevant environmental information. The platform includes a Sawyer robot, AR10 hand, Intel RealSense D435 camera, and a SCiO near-infrared sensor.
- Implemented a multi-layer perceptron (MLP) neural network to map near-infrared spectra to corresponding material categories, achieving 99.64% classification accuracy.
- Conducted real-robot experiments using the Sawyer SDK and AR10 library, achieving 80% grasp success rate.

## SELECTED PUBLICATIONS

- [Task-Oriented Grasping Using Reinforcement Learning with a Contextual Reward Machine](#) – Hui Li, Akhlak Uz Zaman, Fujian Yan and Hongsheng He. (Submitted to IEEE Transactions on SMC: Systems)
- [Towards Neurobotic Interface for Finger Joint Angle Estimation: A Multi-Stage CNN-LSTM Network with Transfer Learning](#) – Yun Chen, Xinyu Zhang, Hui Li, Hongsheng He, Qiang Zhang. (Published at ICRA 2025)
- [Learning Task-Oriented Dexterous Grasping from Human Knowledge](#) – Hui Li, Yinlong Zhang, Yanan Li, and Hongsheng He. (Published at ICRA 2021)
- [MagicHand: Context-Aware Dexterous Grasping Using an Anthropomorphic Robotic Hand](#) – Hui Li, Jindong Tan and Hongsheng He. (Published at ICRA 2020)

## SKILLS

- **Robotics and Simulation:** ROS/ROS2, MoveIt2, ROS2 Control, PyBullet, RViz, Gazebo/Ignition, URDF/SDF
- **ML and Vision Tools:** PyTorch, TensorFlow, Keras, Scikit-Learn, Pandas, Stable Baselines3, Gym, CV2, Open3D
- **Robots and Sensors:** UR5e, Sawyer Robot, AR10 Hand, Schunk SVH, Psyonic Hand, Husky UGV, NAO Robot, Realsense D435, Zivid One, SCiO, ErgoGLOVE
- **Programming Languages and Systems:** Python, C++, Ubuntu, Raspberry Pi4
- **Other:** Blender, Git, ThinkerCAD, Form4, ELEGOO Saturn

## AWARDS

NSF I-Corps Grant, Ph.D. Excellence Award, Travel Award (ICRA20, 21, 25), Outstanding Research Output