

# Adam Imdieke

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## RESEARCH FOCUS

- Multisensory robot manipulation learning, focusing on novel hardware for robot perception and neural network architectures for manipulation policies.
- Current work includes developing a tactile skin for arms on high DoF robots (Boston Dynamics Spot arm) and Contact aware Inverse Kinematics to enhance whole-body environmental interaction.

## PUBLICATIONS

### SPARK-REMOTE | LEAD AUTHOR

🔗 [ArXiv](#) | Apr 2025

- A Cost-Effective System for Remote Bimanual Robot Teleoperation.
- Proposes haptic feedback and torque limiting controllers for our dual-arm UR5e robot arm to improve depth perception and bimanual manipulation loop closure.

### AUGINSERT | CO-AUTHOR

🔗 [IROS 2025](#) | Aug 2025

- Learning Robust Visual-Force Policies via Data Augmentation for Object Assembly Tasks. Leverages Force / Torque data, proprioception, and vision to learn robust insertion policies.

### TALK THROUGH IT | CO-AUTHOR

🔗 [RAS 2024](#) | Jul 2024

- End User Directed Manipulation Learning using feedback to Guide Robot Skill Acquisition.

## PROJECTS

### TACTILE SKIN FOR SPOT | RESEARCH PROJECT

🔗 [Project Page](#) | May 2025–Present

- A Novel, Low-cost 3D printed tactile skin for robotic arms to enhance whole-body environmental contact sensing.
- Leverages high Degree of Freedom robots to condition Inverse Kinematics null spaces to satisfy contact constraints.
- Hardware development for real-time Contact aware Inverse Kinematics (ContactIK) enabling contact avoidance contact embracing behaviors.

### GENERATIVE MODELS | RESEARCH PROJECT

Sep 2025–Present

- Investigating Video Diffusion Models for Zero-Shot Robotic Manipulation Policy Learning

### SPOT NATURAL LANGUAGE INTERFACE | CLASS PROJECT

🔗 [Project Page](#) | Nov 2023–Present

- Integrating LLM control of Boston Dynamics Spot, enabling natural language commands for long-horizon tasks.
- Novel human following capabilities, robust to dynamic environments and crowds.

## EDUCATION

### UNIVERSITY OF MINNESOTA

PH.D. IN COMPUTER SCIENCE

Sep 2024–Present | Minneapolis, MN

### UNIVERSITY OF MINNESOTA

M.S. IN ROBOTICS

Sep 2023–Present | Minneapolis, MN

### UNIVERSITY OF MINNESOTA

B.S. IN COMPUTER ENGINEERING

Sep 2019–May 2023 | Minneapolis, MN

## SKILLS

### POLICY LEARNING

NN based manipulation policies • Diffusion learning • Reinforcement learning • Multisensory perception

### TECHNICAL SKILLS

Python • C++ • PyTorch • Jax • ROS/ROS2 • Git • Linux ( 10 years ) • Network programming

### ROBOT CONTROL

Inverse Kinematics • Motion planning • Force/Torque response • Impedance control

### HARDWARE DEVELOPMENT

CAD modeling • 3D printing (SLA, FDM) • PCB design • SMD soldering • Embedded systems

### SIMULATION

Mujoco • PyBullet • ROS • Isaac Lab

## INTERESTS

### MACHINE LEARNING

Generative models • Perception Models • Manipulation Policy Learning • Transformers • Neural Architectures • Imitation Learning (IL) • Reinforcement Learning (RL)

### CONTROL

Optimization-based control (IK, MPC) • Modern Control • System ID • Filtering

### TELEOPERATION

Human-Robot Interaction • Haptic Feedback • VR Interfaces • Low-latency Systems