HapTech
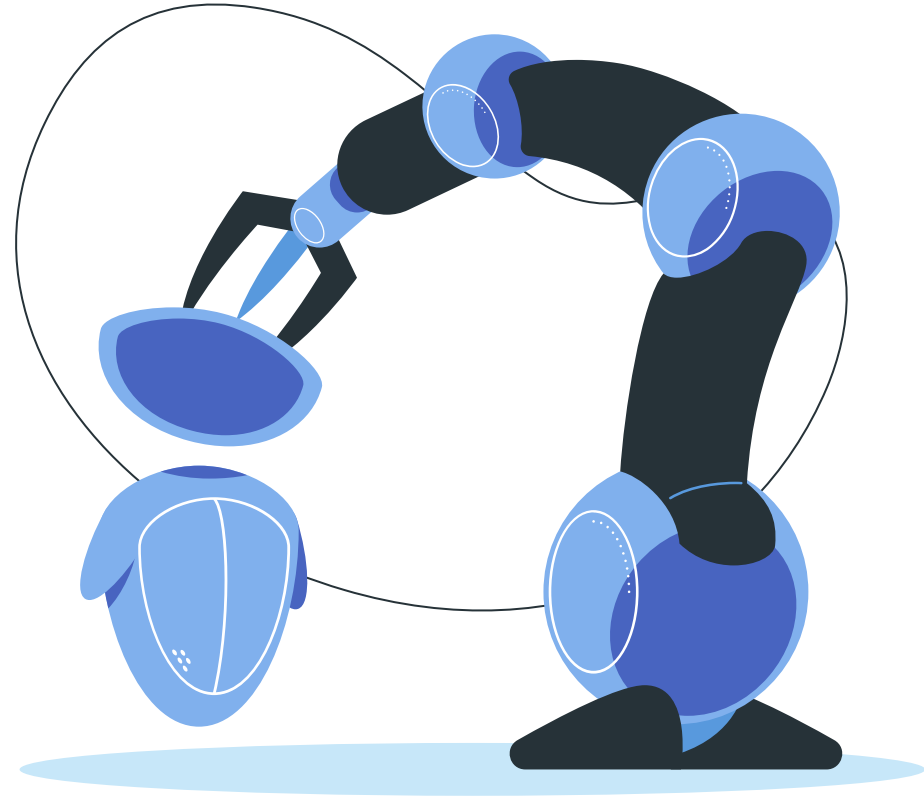### HAPTIC RENDERING

By: Landon Coonrod, Matthew Gardner, Peter Hilbert, & Karissa Smallwood

Mentor: Veerendernath Surendernath Komala

Haptic Touch

Haptic Touch is transforming our digital experiences by adding real tactile feedback.

- Innovations from medicine to home environments.

- Tactile feedback improves surgical training and procedure accuracy.

- Virtual environments and gaming become more engaging.

- Our project drives R&D in advanced haptic interaction technologies

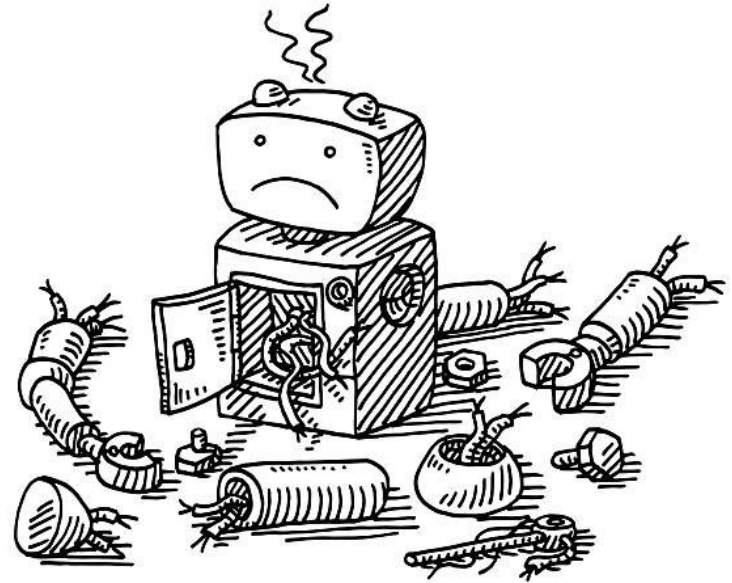# Client Introduction

Dr. Reza Sharif Razavian

- Assistant Professor in ME, specialized in robotics.

- Researching human-robot interaction

- NAU Raz Lab

  - Bridges robotics, neuroscience, and biomechanics

Problem Statement

The current setup was difficult to work with which lead to Dr. Razavian to abandon the project.

- Lack of Modularity

- No Data Collection System

- Obstacles in Human-Robot Studies
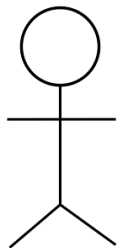
- Inefficient Workflow
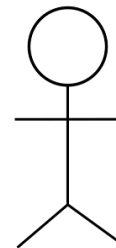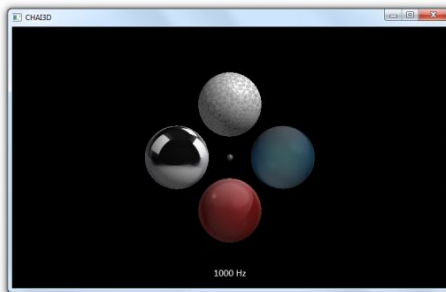
Envisioned Solution

A user-friendly end-to-end software system that will enable researchers to easily conduct human-robot interaction studies with the FR3 robot.

Key Features:
- Seamless integration of haptic rendering engine and robot
- UI to easily set up simulations
- Data collection and analysis

Setup, data collection

Interact with simulation
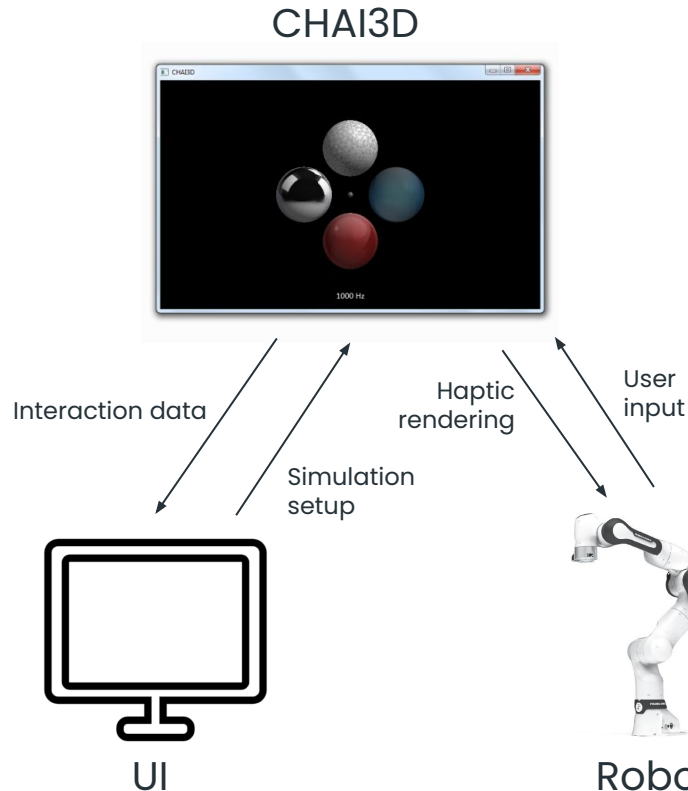
Development Plan

Client Interactions

- Weekly client meetings
  - Learn how to use the robot
  - Provide updates, ask questions

Technical Challenges

- Integrate libfranka (robot API) and CHAI3D (haptic engine)
- Frontend and backend communication
- What technology for the frontend?

Logistical Challenge

- Need to be at the lab to use the robot for development/testing

CHAI3D

Interaction data

Simulation setup

Haptic rendering

User input

UI

Robot

6

Closing

Key Takeaways

- Make Research Easier

- Collect Data

- Bridge the gap between human-robot

  interaction