



NORTHERN
ARIZONA
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School of Informatics, Computing,
and Cyber Systems

What is the Problem?

Haptic simulations, or the simulation of touch in a virtual environment, are key to advancing our understanding of **human-robot interaction** and movement of the human body. However, setting up these human-robot experiments currently takes **a lot of time and manual coding**. This makes it **hard to reuse past work** and **collect consistent data** across studies.

Solution Overview

Our product integrates experiment design & control, 3D & haptic rendering, and data collection into one simple workflow.

- Experiments are built through **simple XML configuration files**, making them **easy to modify and reuse**.
- Researchers run these experiments through a **command-line interface**, which automatically **collects** and **organizes** the output data.

A Modular Software Platform for Human-Robot Interaction Experiments



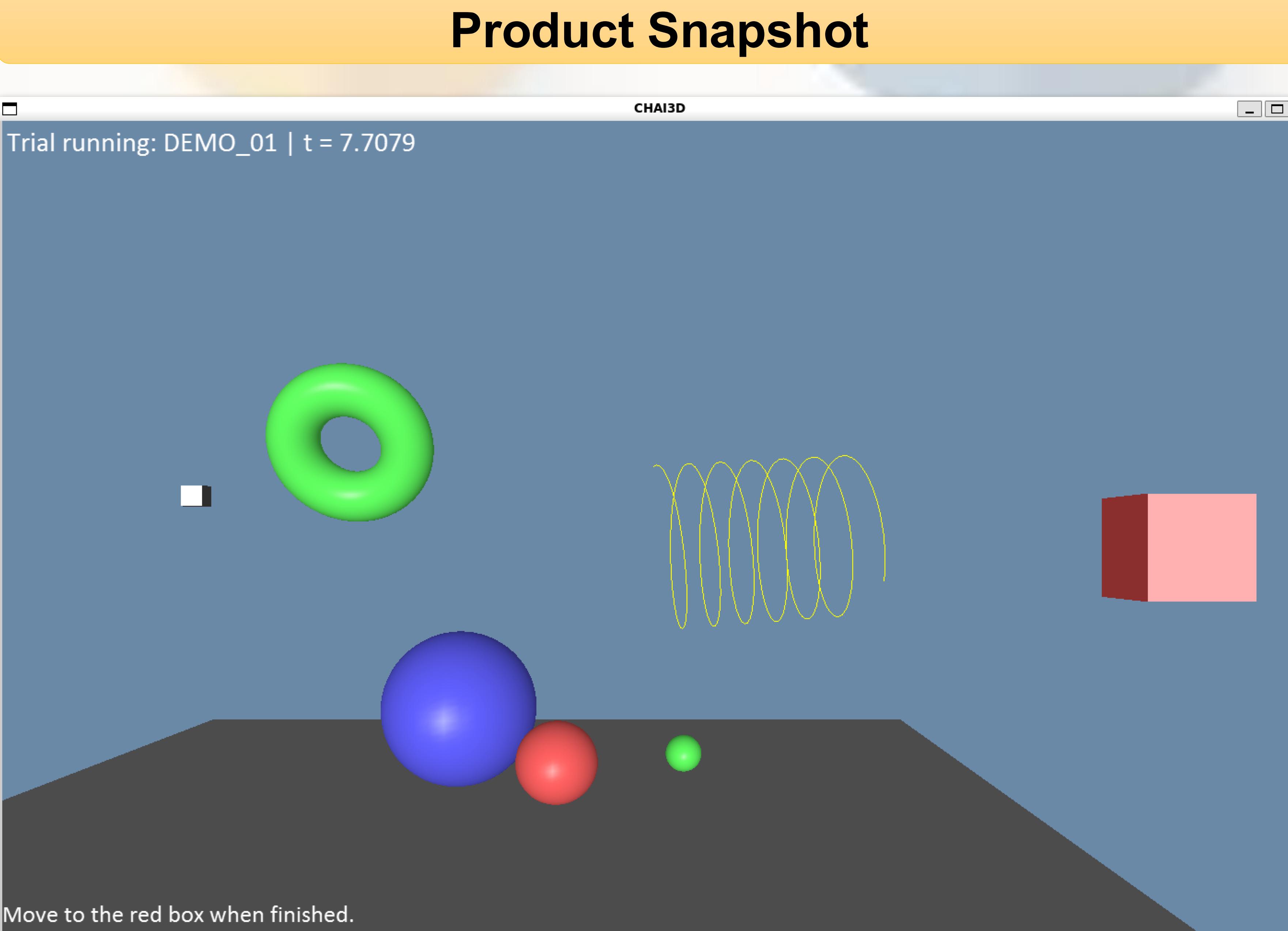
Landon Coonrod, Matthew Gardner,
Peter Hilbert, Karissa Smallwood

Client

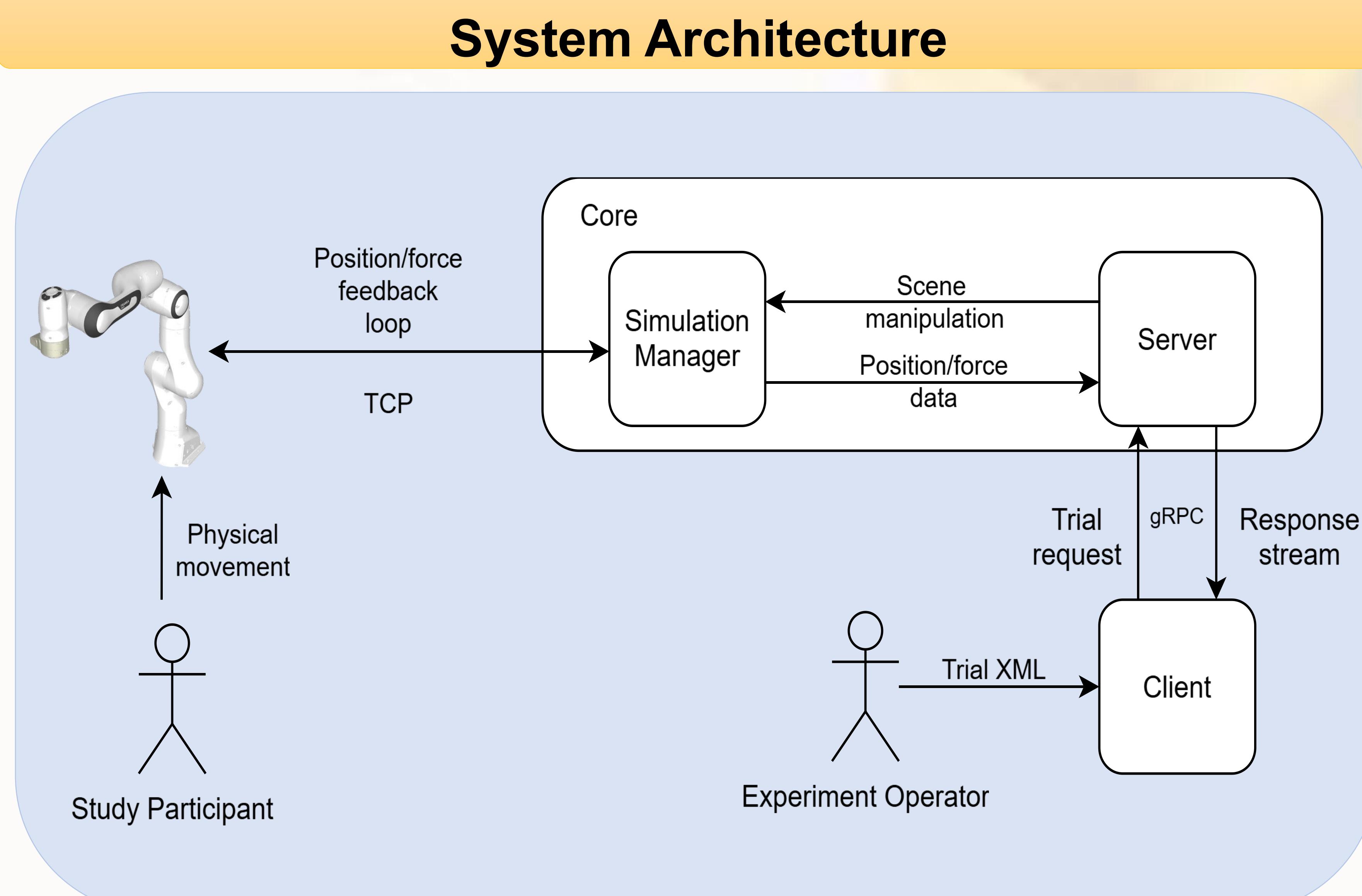
Dr. Reza Sharif Razavian,
Assistant Professor, NAU

Team Mentor

Karthik Srivathsan Sekar



Product Snapshot



System Architecture

Key Features

- **Trial configuration:** XML configuration defines 3D objects, trial start & end conditions, and scene settings.
- **Data collection:** Data points containing robot position and force as well as object states are collected from each trial for analysis.
- **Expandable architecture:** code allows for the addition of new object types and trial conditions.

Technologies

chai3d



- C++ framework for 3D haptic rendering.
- Franka Research 3 Robot specific to our project.
- Used to write command line tool.

Visit our team's website if you'd like to learn more!

