



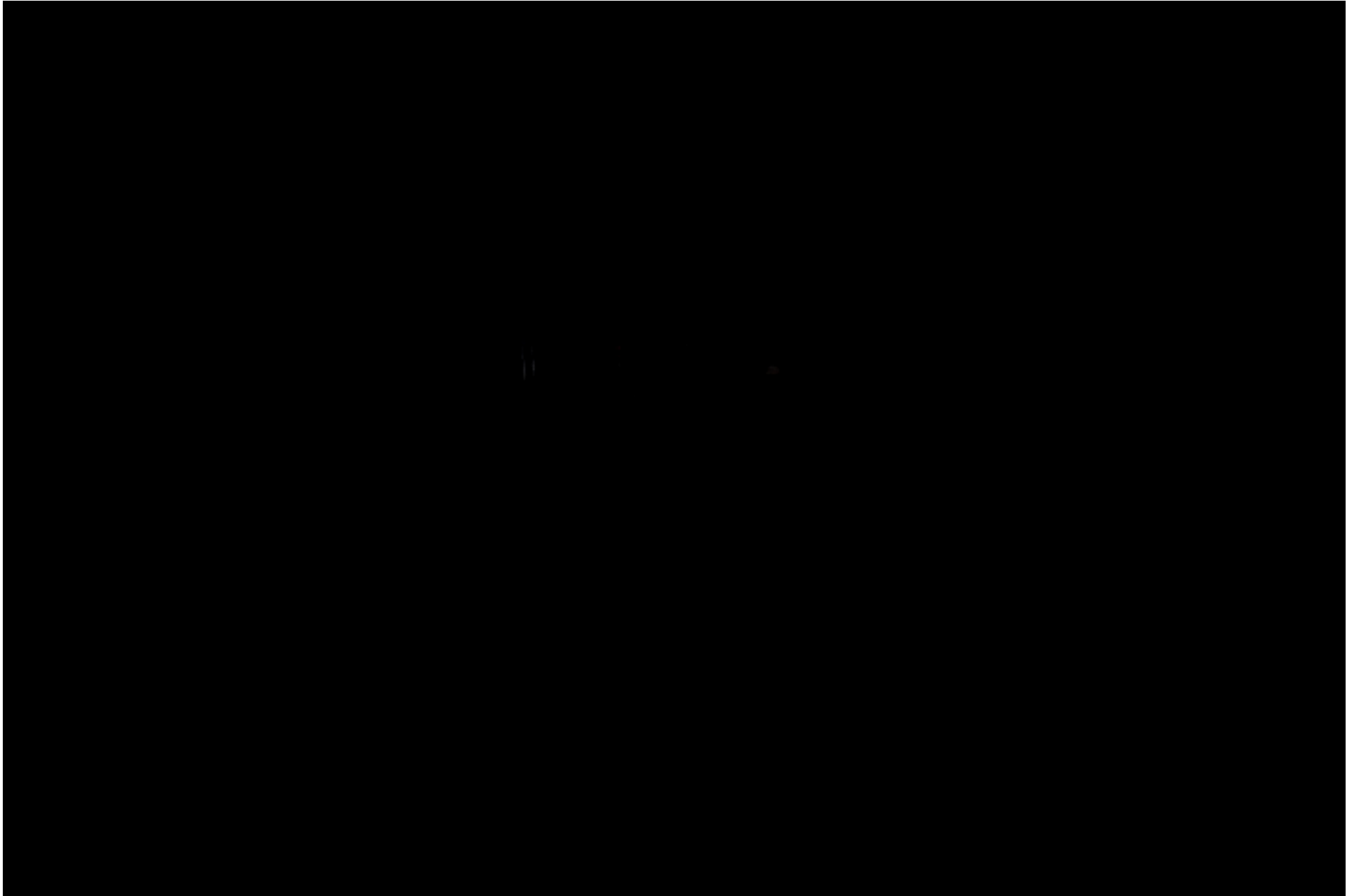
Personal Robots Group

Lab Projects Overview

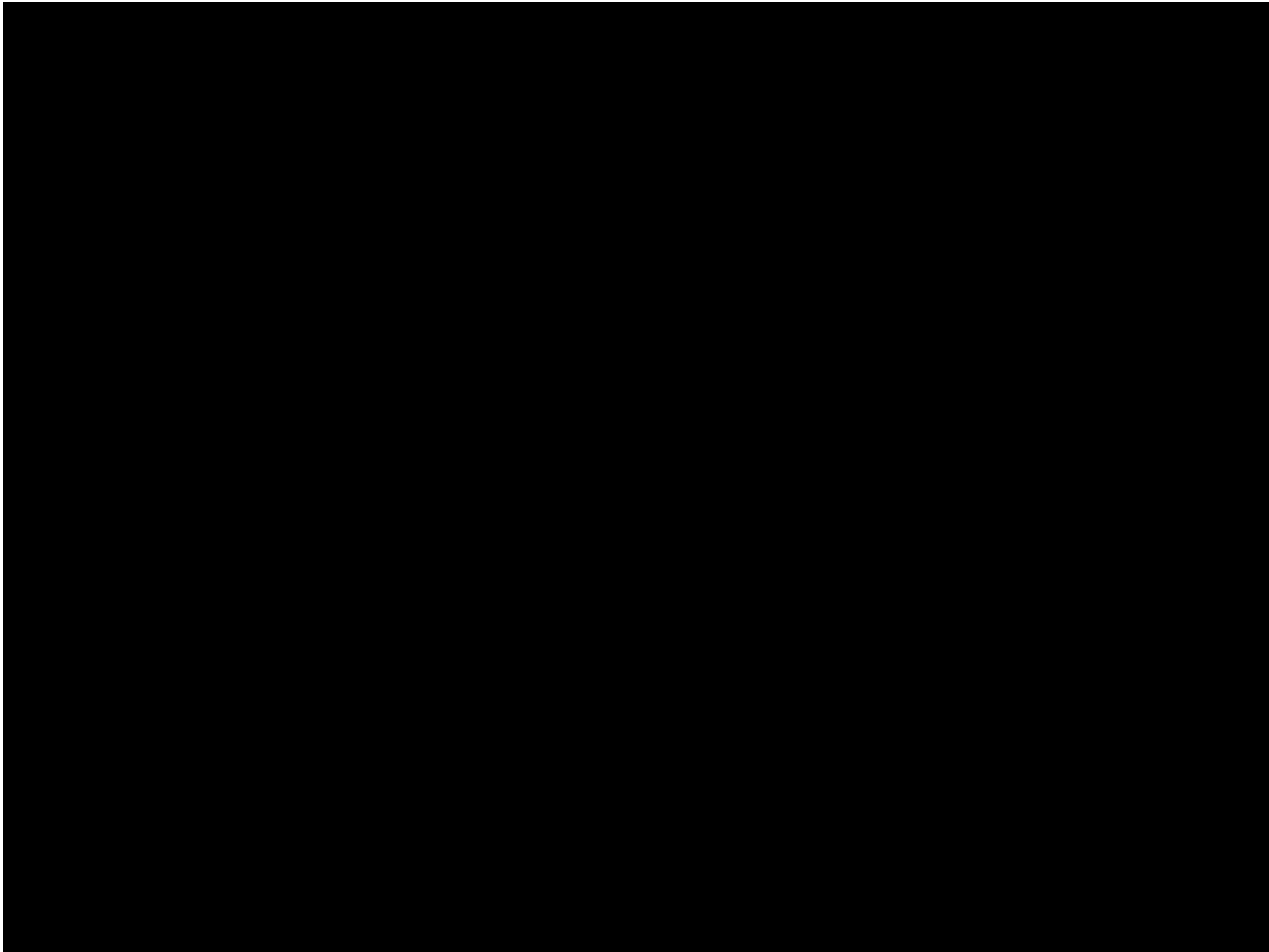
by

Mikey Siegel









Mission

Projects

People

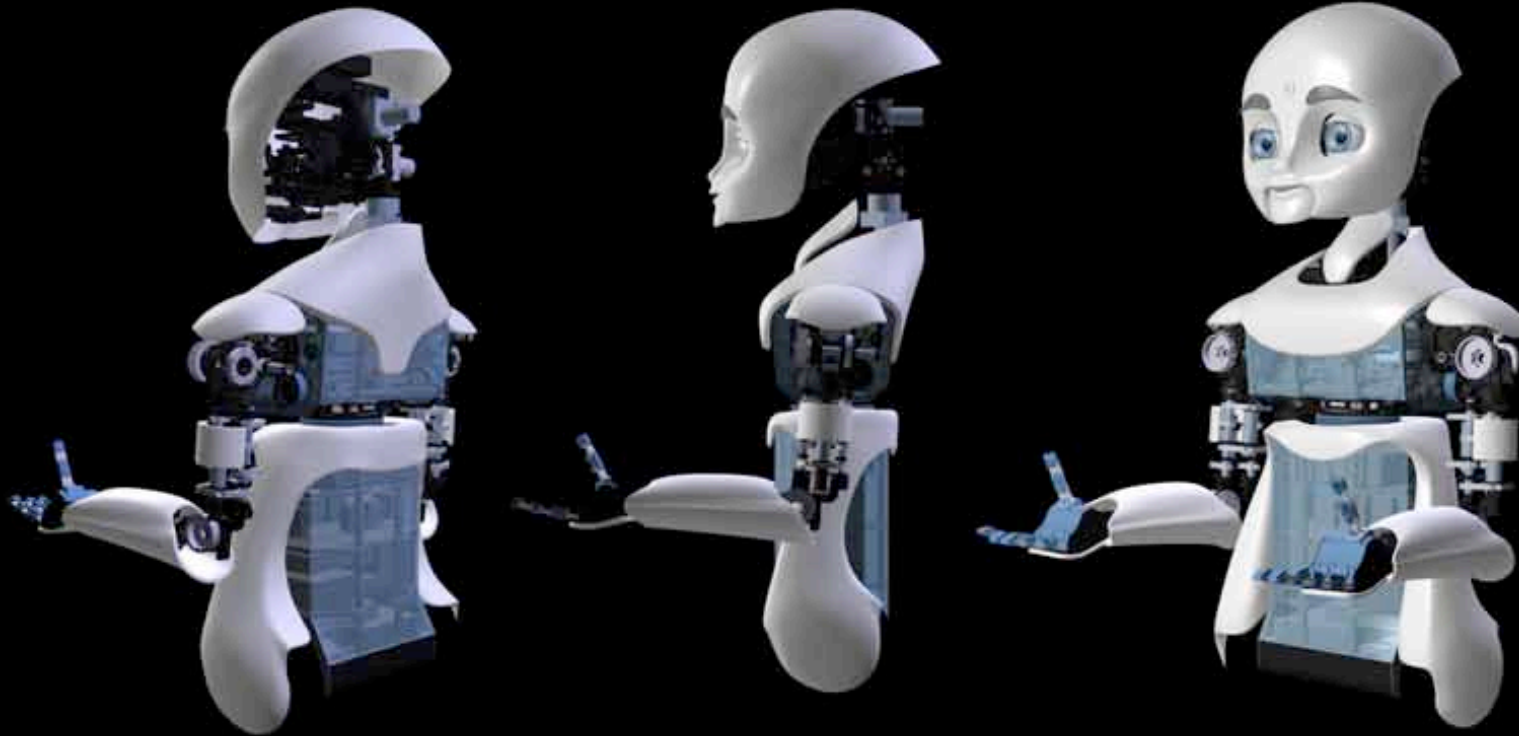
Publications

Resources

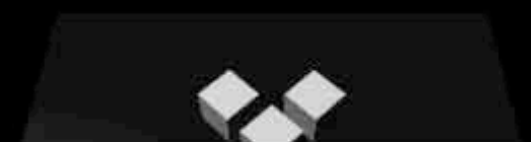
Contact

Personal Robots Group

mit media lab



Welcome to the Personal Robots Group



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Introduction to HRI and Social Robots

Project Descriptions

Project **1**: Leonardo

Project **2**: Huggable

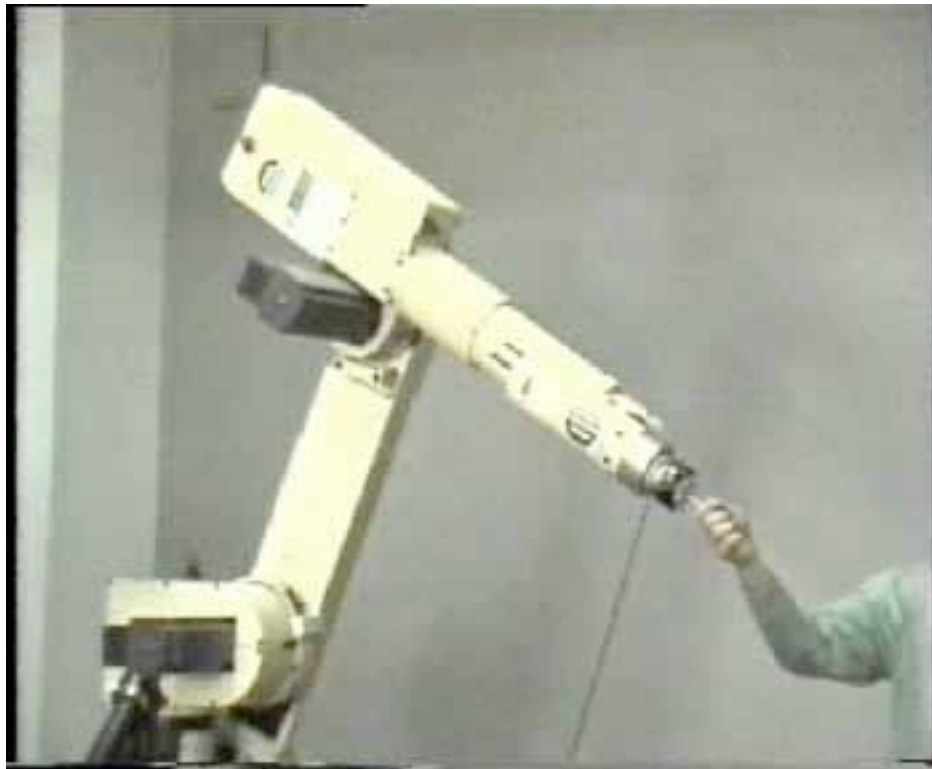
Project **3**: AUR: Robotic Desk Lamp

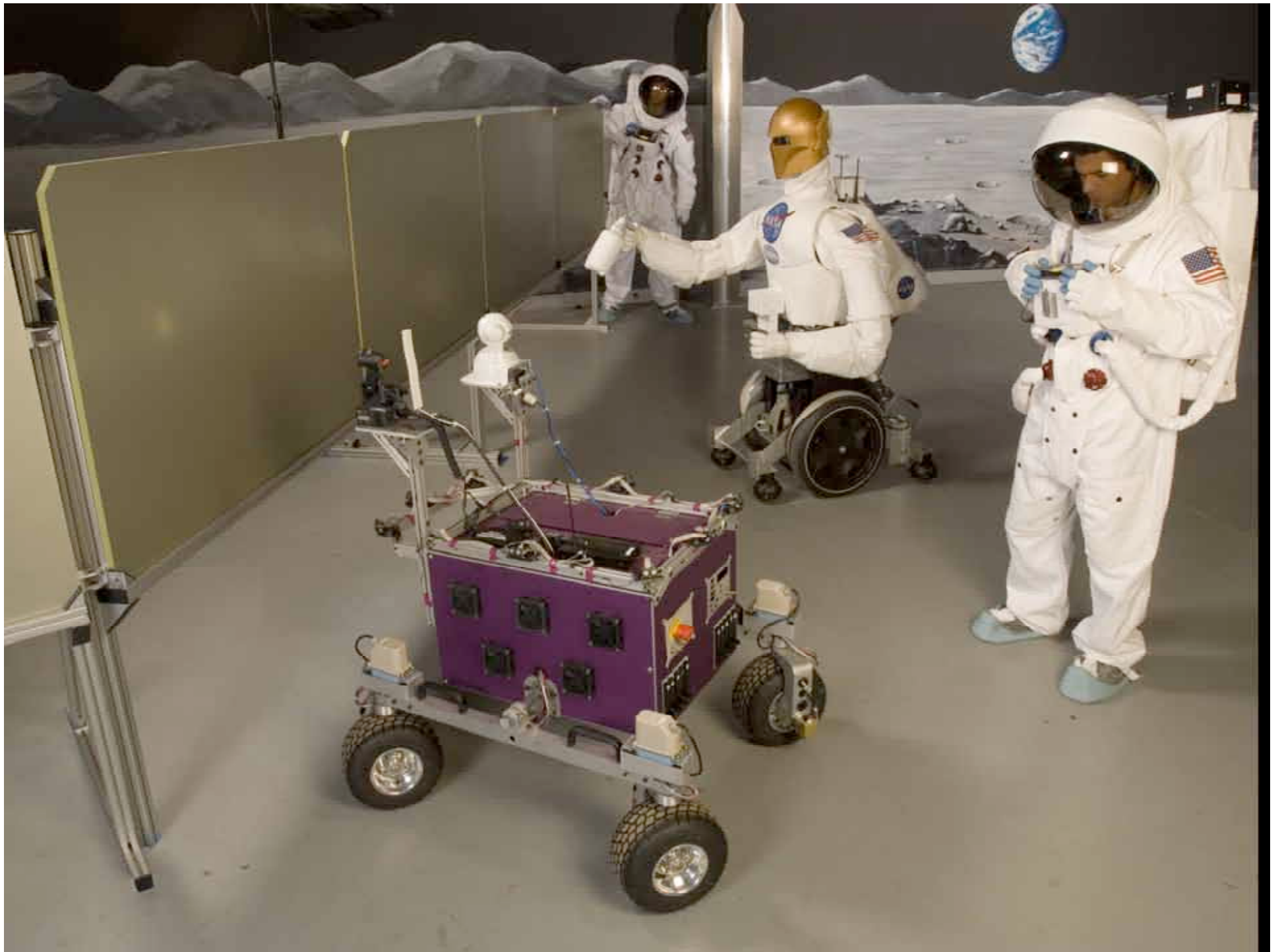
Project **4**: Weight Loss Robots

Project **5**: OperoBots

Conclusion and Discussion

Human Robot Interaction





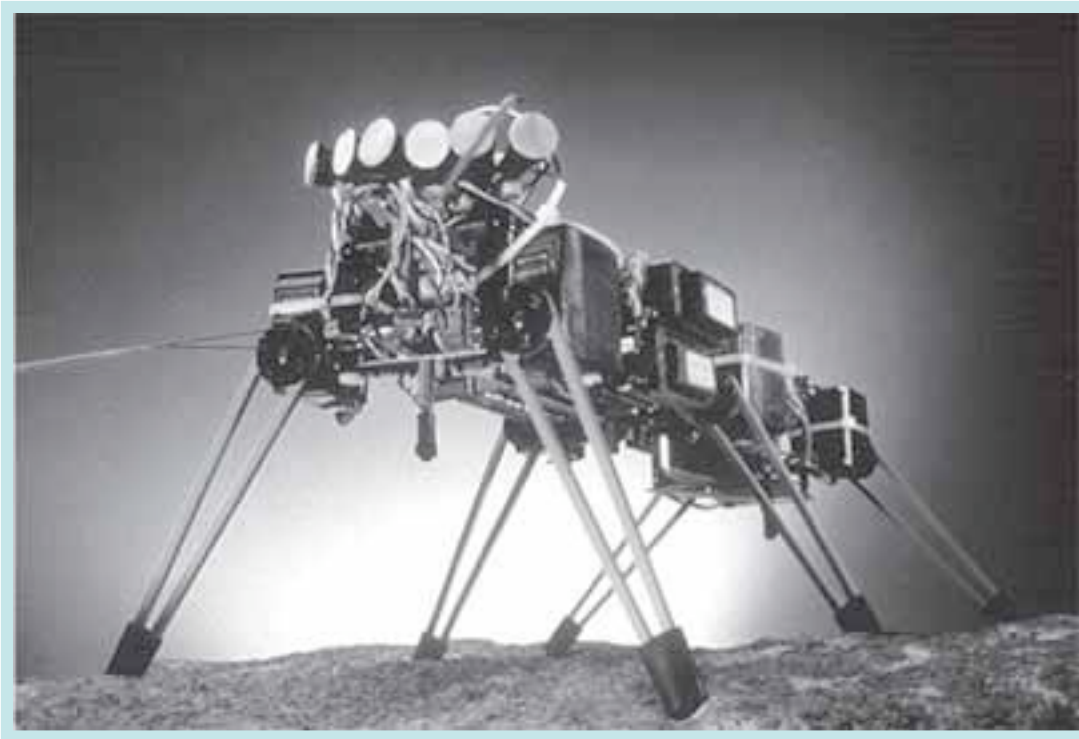








Social Robots



Early work was inspired by interaction among insects and the term *social* referred to interaction among a group of robots.

Brooks, R. A. A Robot that Walks; Emergent Behaviors from a Carefully Evolved Network. MIT AI Lab Memo 1091, February 1989.

Sociable Robots



Later work on humanoid robots used the term *sociable* to talk about robots that embodied human intelligence and responded to human input

Brooks, R., et al. The Cog Project: Building a Humanoid Robot. in Nehaniv, ed. Computation for Metaphors, Analogy and Agents. Springer LNCS, 1998.

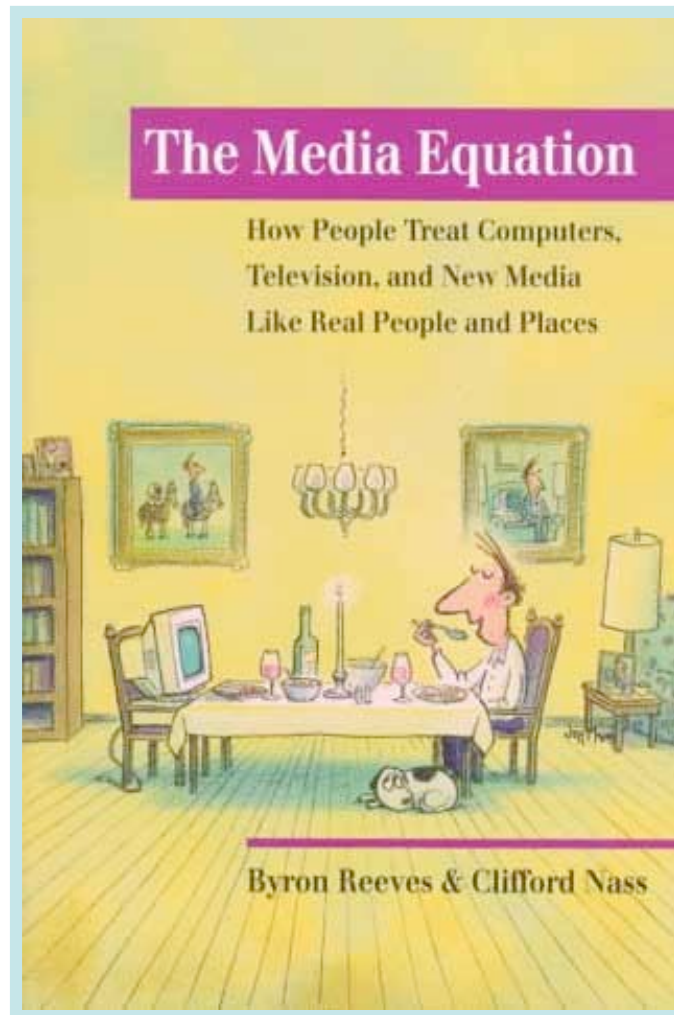
***Sociable* Robots**



Currently a *sociable robot* is defined as participating in social interactions with people in order to satisfy some internal goal or motivation

Breazeal, C. Designing Sociable Robots. MIT Press, 2002.

Social Robots

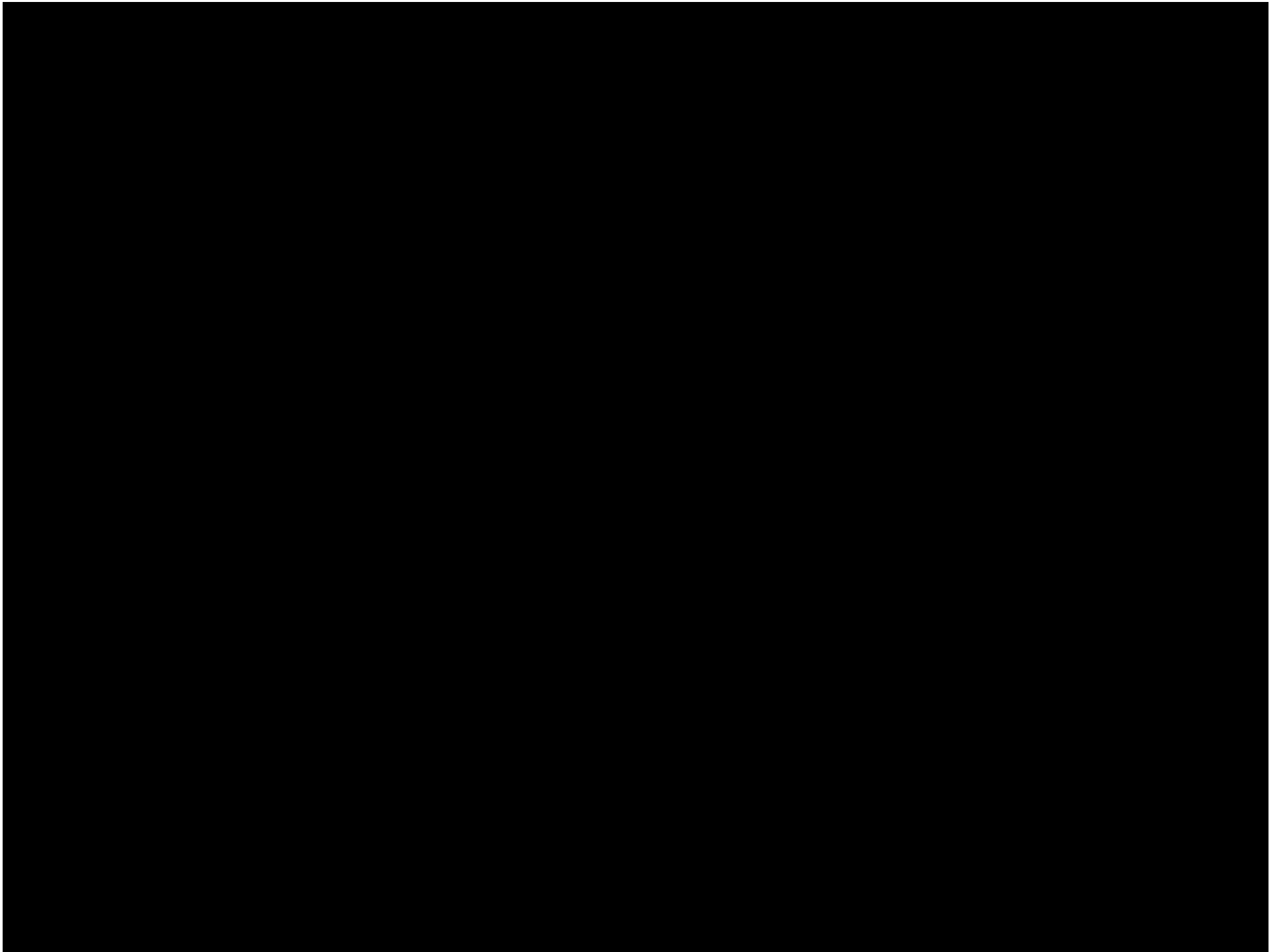


Leonardo









The Huggable



Dan Stiehl

The Huggable: Design Overview

Microphones

Cameras

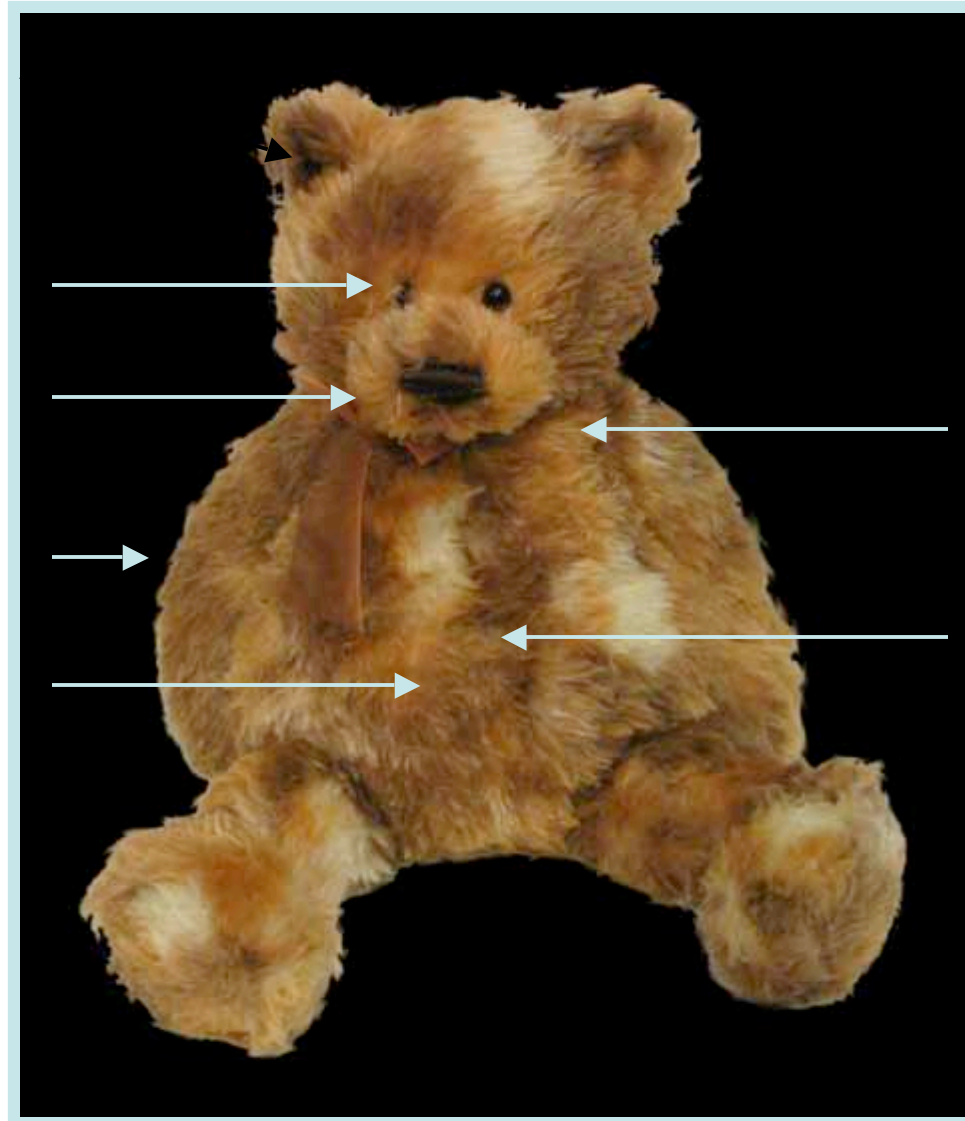
Speaker

Full Body
"Sensitive Skin"

Embedded PC
w/802.11g

Based upon research
in pet therapy and the
human and animal
somatosensory system

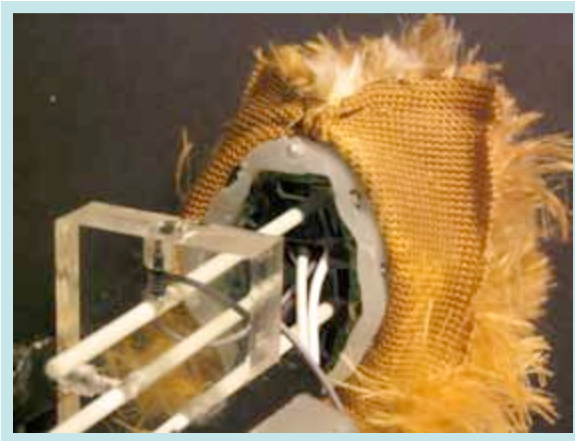
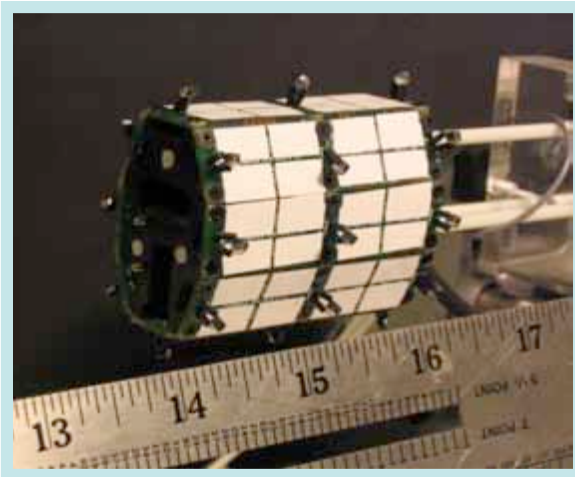
Goal: Clinical Trials
in Hospitals and
Nursing Homes



Quiet
Mechanical
Drives

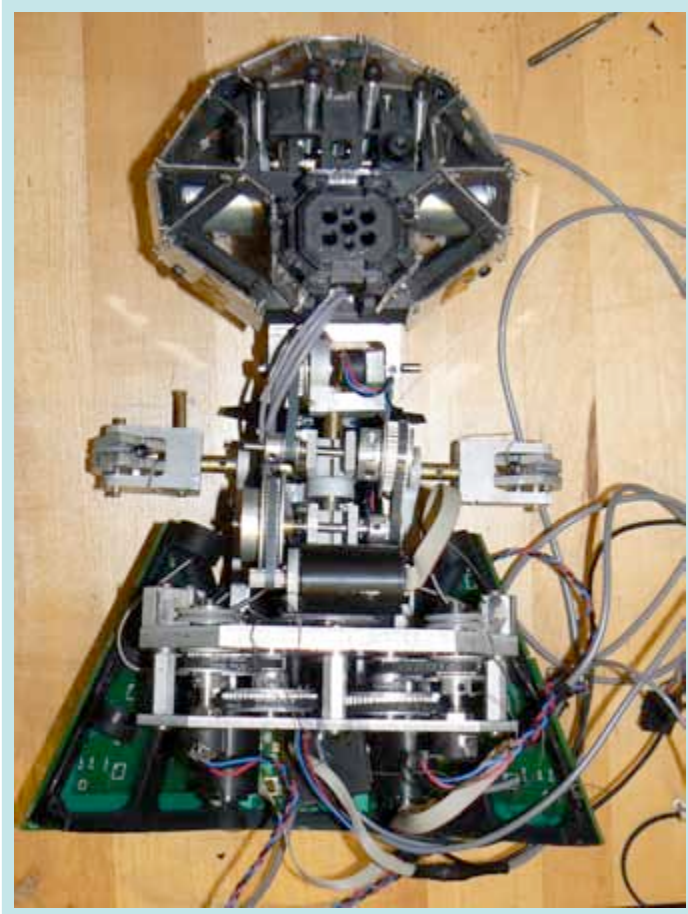
Inertial
Measurement Unit
(Morris, 2004)

Huggable: Sensitive Skin



- Full-body sensor coverage with distributed processing of hundreds of sensors in each body region: estimate of ~1000 sensors for entire robot
- 4 Modalities of Sensing:
 - Temperature, Touch, Proprioception, Pain
- 3 sensor types of somatic information
 - Electric Field (Motorola 33794): proximity/human contact
 - Temperature (Thermistors)
 - Pressure (QTC)
- Additional passive potentiometers (ankles, hip joint)
- Soft, life-like silicone skin
- Affective categorization of touch to distinguish petting, patting, tickling, etc

Huggable: Mechanical Drive System

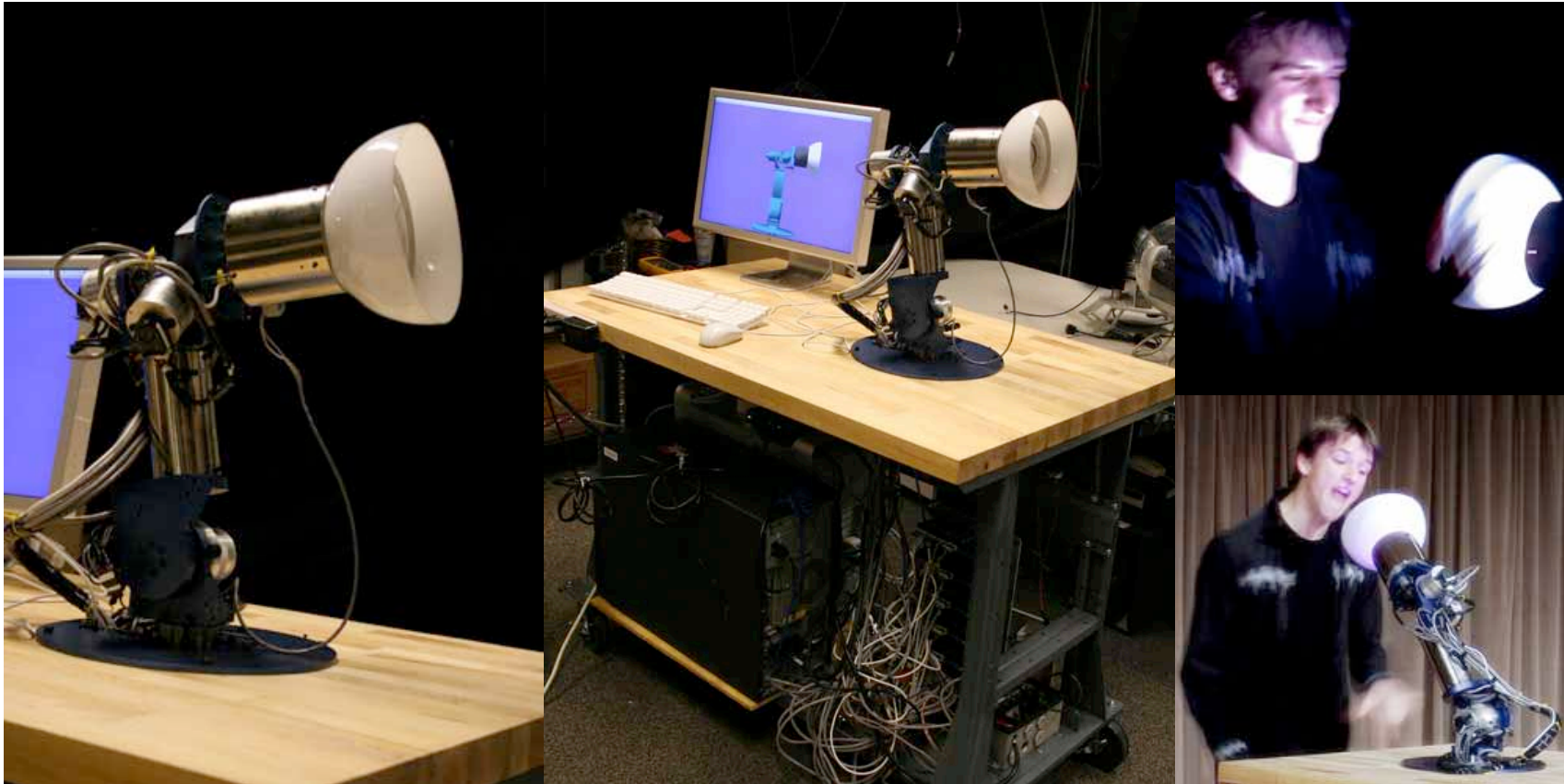


- Current robotic platforms use geared DC motors
 - Noise due to gear train
 - Backlash in the gears
 - Risk of damage to gear teeth
- Quiet Mechanical Drive System
 - Silent
 - Smooth Motion
 - Compliant and Back Drivable to prevent damage to person and to robot
- Degrees of Freedom:
 - 2-DOF Neck (relational touch)
 - 2-DOF Eyebrow (expression)
 - 2-DOF “Hug” (relational touch)
 - 1-DOF Ears (expression)*

*in development



AUR: Robotic Desk Lamp



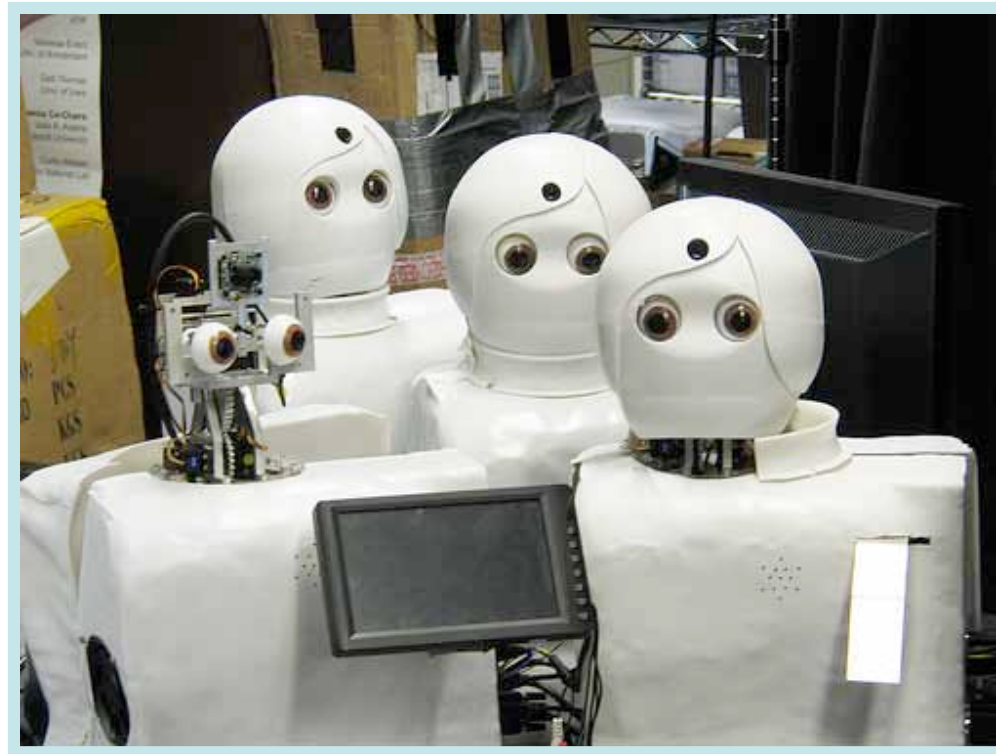
Guy Hoffman

AUR
a robotic desk lamp

Guy Hoffman

MIT Media Lab
May 2007

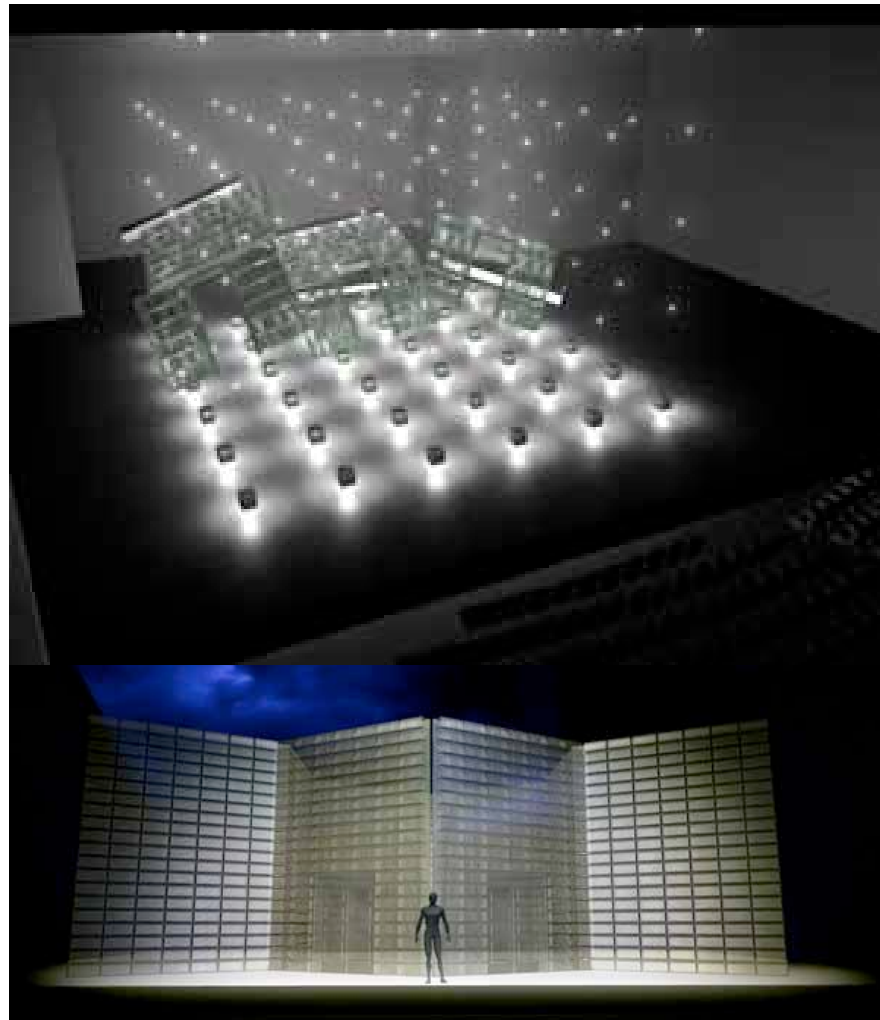
Sociable Robot for Weight Maintenance



Cory Kidd



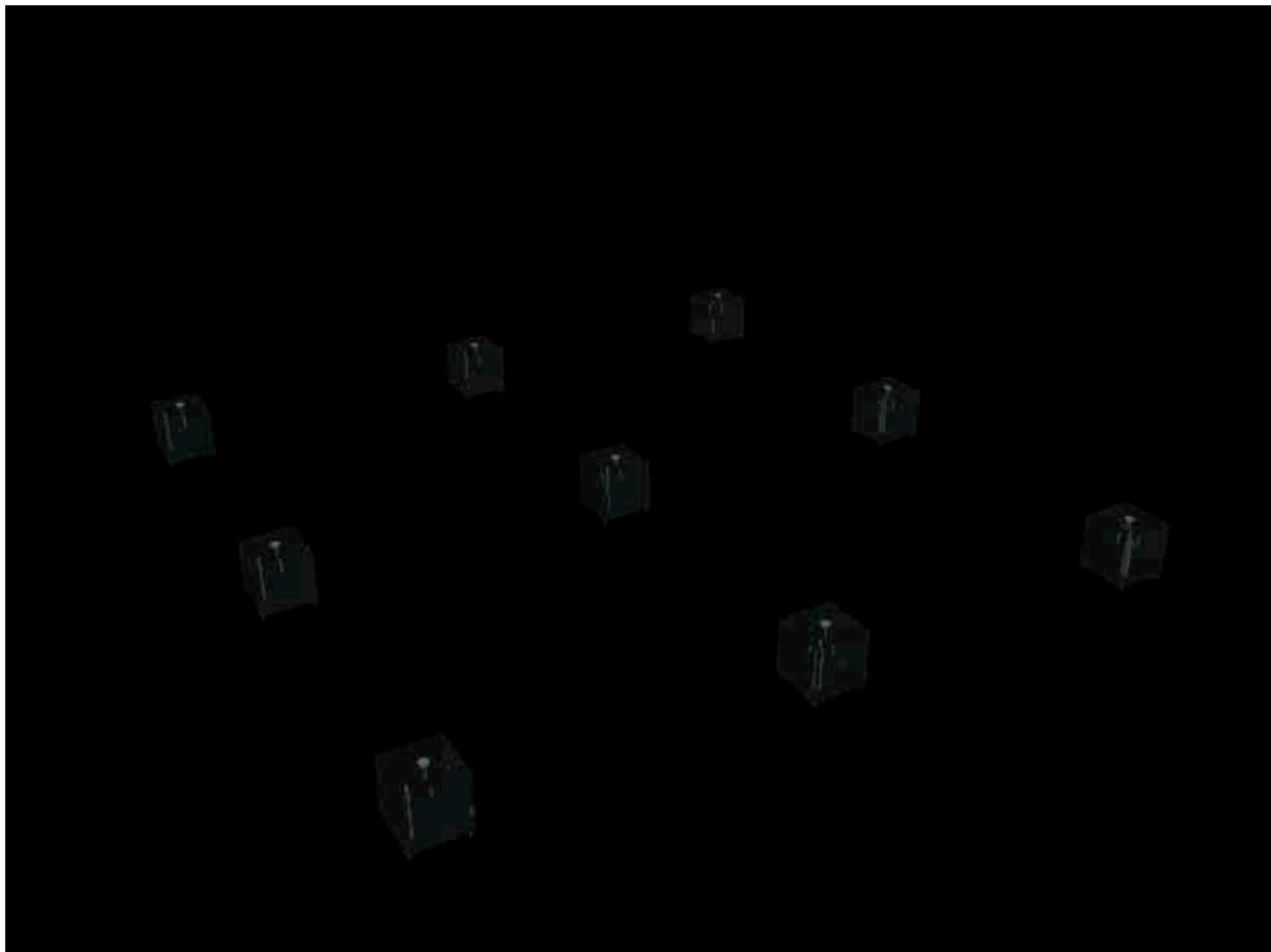
OperoBots



Jeff Lieberman



Mikey Siegel



OperoBots: Proof of Concept

1. Direct robot choreography from 3D animation
2. Very accurate real-time tracking and control
3. Compelling and convincing action, suitable for stage

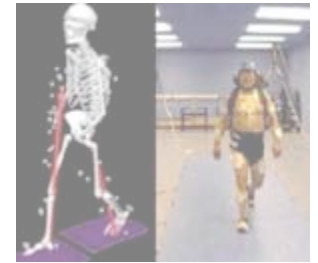
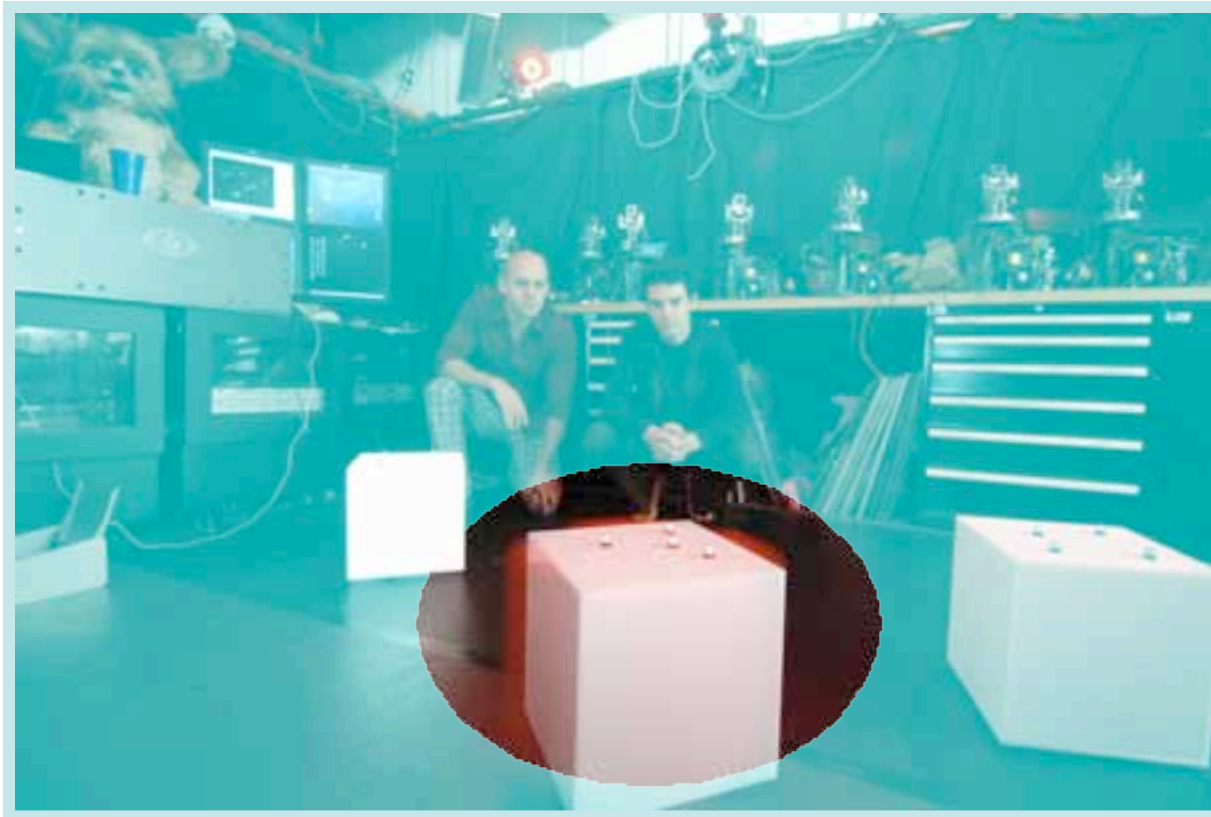
OperoBots: Proof of Concept

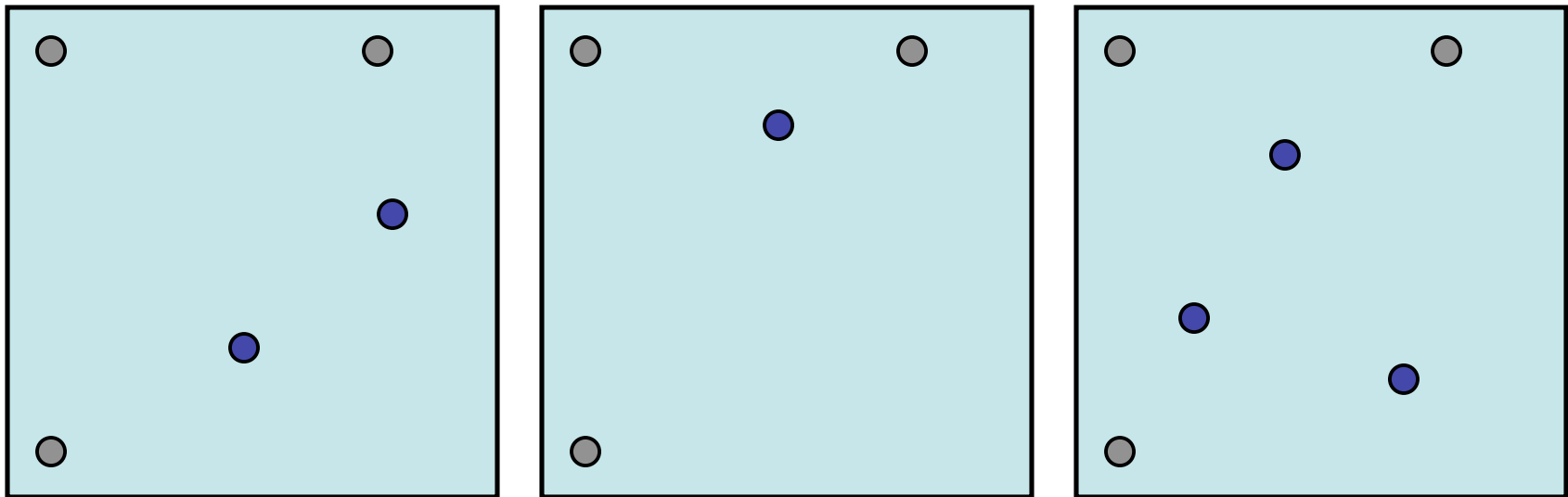


OperoBots: Tracking System



OperoBots: Tracking System





● Position/Orientation

● Identification



OperaBots
May 2007

Thank You

We're currently looking for UROPS!

Visit anytime: E15-468

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Web: Robotic.media.mit.edu

