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# NRI: FND: COLLAB: AN OPEN-SOURCE ROBOTIC LEG PLATFORM THAT LOWERS THE BARRIER FOR ADVANCED PROSTHETICS RESEARCH

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[www.opensourceleg.com](http://www.opensourceleg.com)

open access Nature BME publication

## Introduction

### Motivation

- Many researchers studying control of robotic prosthetic legs
- Difficult to compare results across platforms
- Substantial investment of time and resources

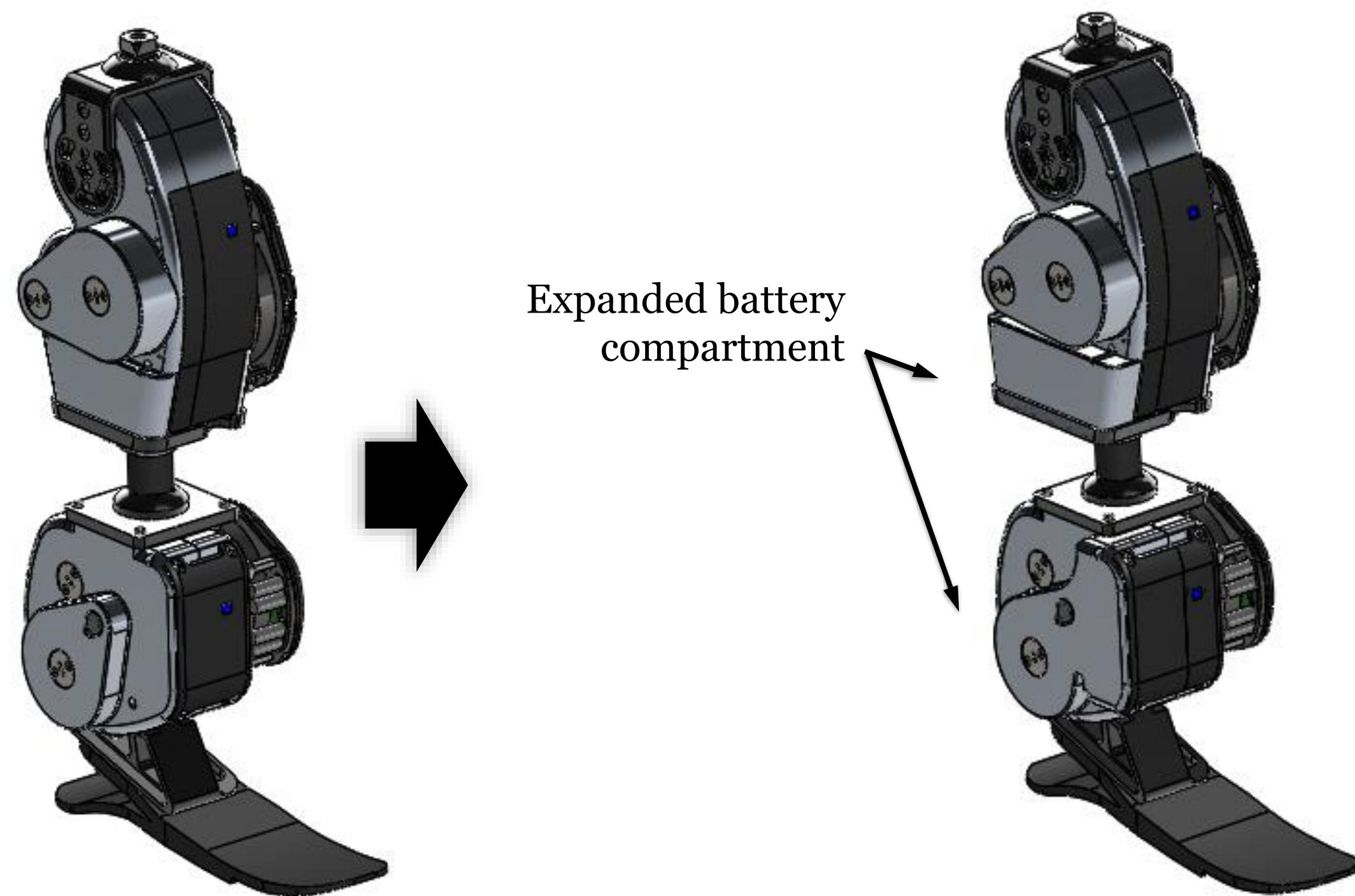
### Goal

- Common hardware platform for control comparison
- Lower the barrier to entry
- Enables investigations in the lab, community, and at home

## Design Modification

### Housing Design Update

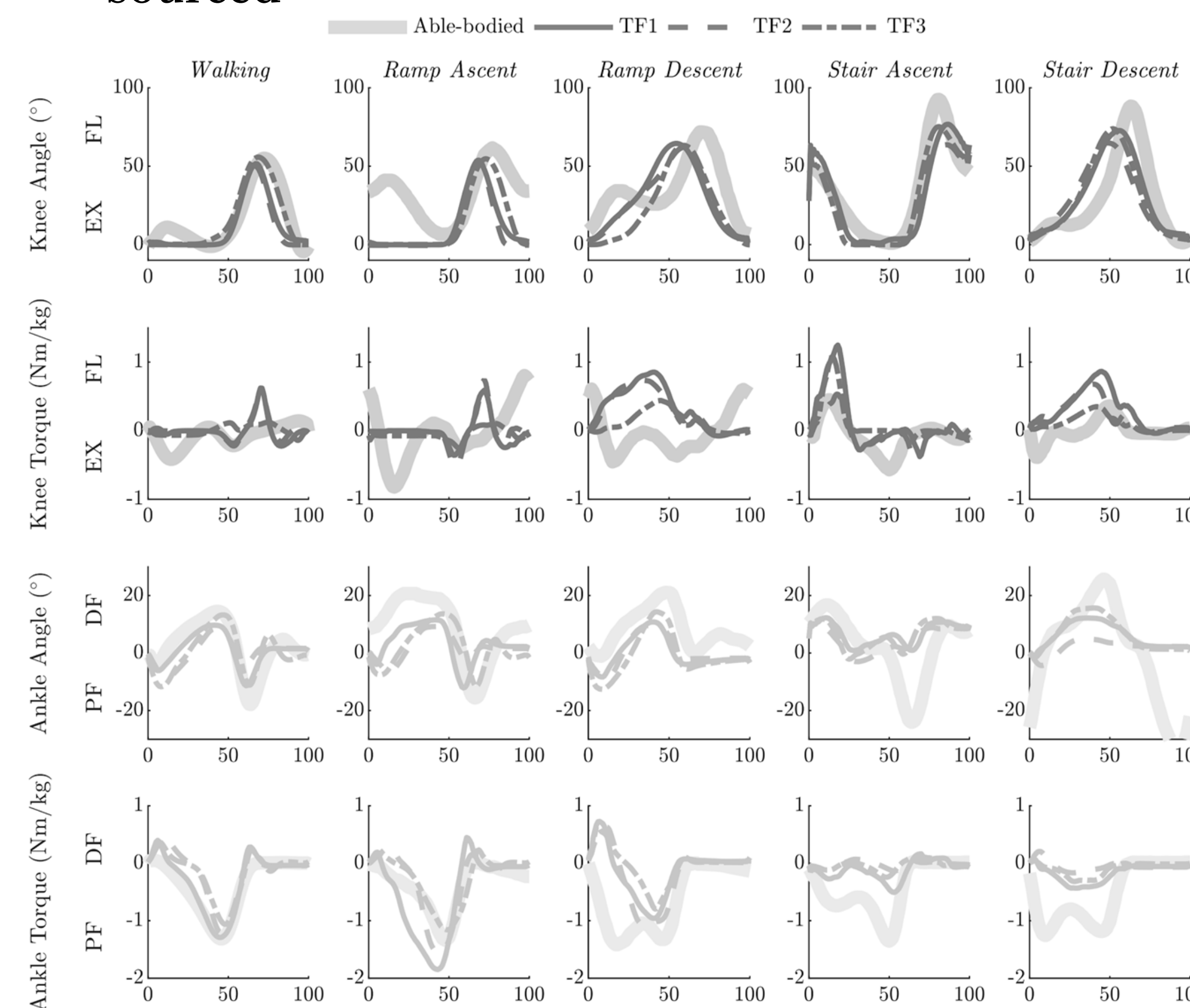
- Changes in battery availability and desired for greater use time led to re-design of the OSL housing for a larger and more available battery



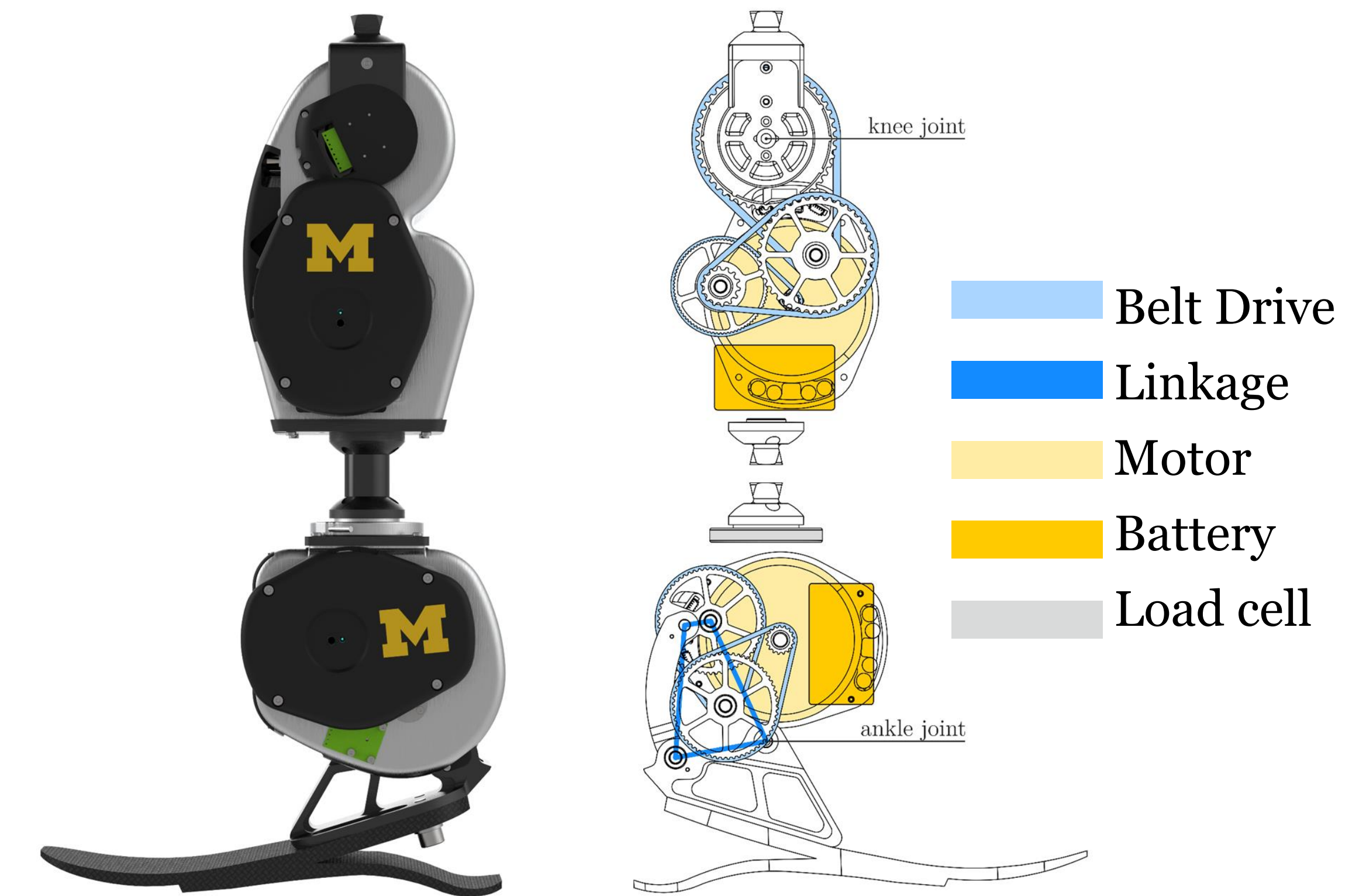
## Clinical Testing

### Demonstration of use

- Clinical testing in hospital setting
- 3 individuals with above-knee amputations successfully navigated through ambulation circuit
  - Controller parameters and biomechanical data open sourced



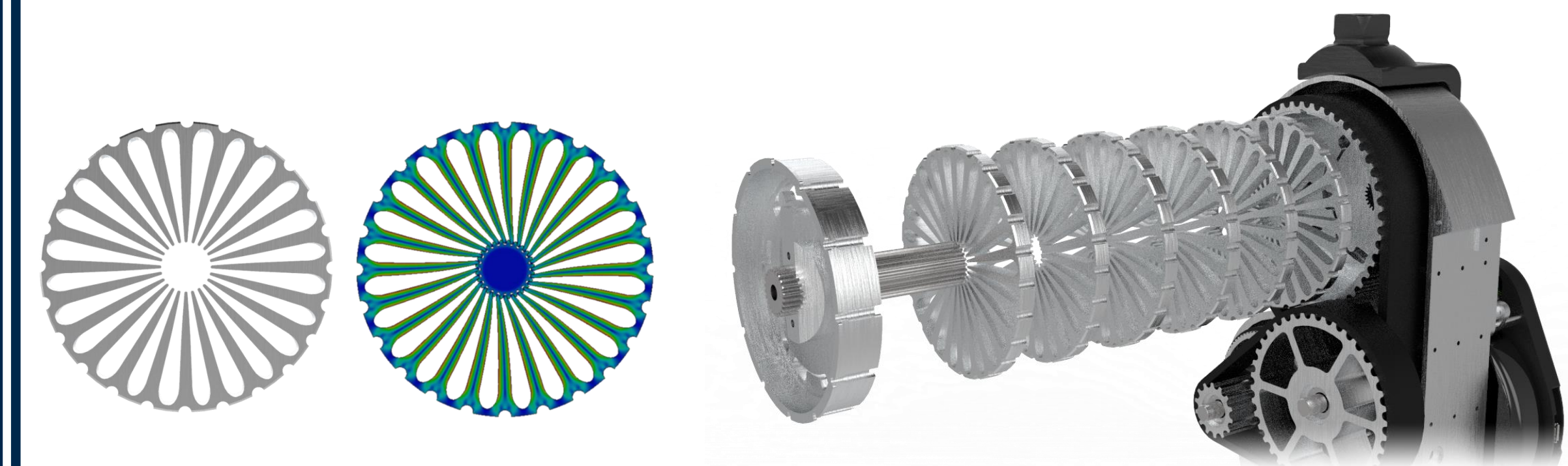
## Design



- Modular 2 DOF knee-ankle prosthesis
- Mass: Knee: 2300 g, Ankle: 1700 g
- Transmission Ratios: ~50:1

### Selectable Series Elasticity

- Custom torsional spring disks:  $k = \sim 100 \text{ Nm/rad}$
- 0-6 spring disks can be stacked inside knee output pulley



## Current Users



Northwestern



UNIVERSITY of WASHINGTON



Imperial College London

