NRI: FND: COLLAB: An Open-Source Robotic Leg Platform that Lowers the Barrier for Advanced Prosthetics Research

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Motivation

- Goal: Develop an open hardware platform for robotic leg prostheses that

    - Eases comparison across different control strategies

    - Reduces the expense of developing custom prostheses to test control

    - Lowers the barrier for researchers in related fields to get involved

Gregg *et al.* U-M   Goldfarb *et al.* Vanderbilt   Ames *et al.* Caltech   Rouse/Herr *et al.* MIT   Geyer *et al.* CMU   Lenzi *et al.* U Utah

Results

- Designed v1 and v2 versions of the modular 2-DOF ankle-knee prosthesis

- Characterized BLDC motors implemented in design

- Characterized performance of position / current controllers

- Developed open-source FSM control infrastructure and datasets

- Demonstrated performance in study with persons with amputation

Output pulley

Tensioner

Input pulley

Raspberry Pi

Battery

Actuator

Belt-drive
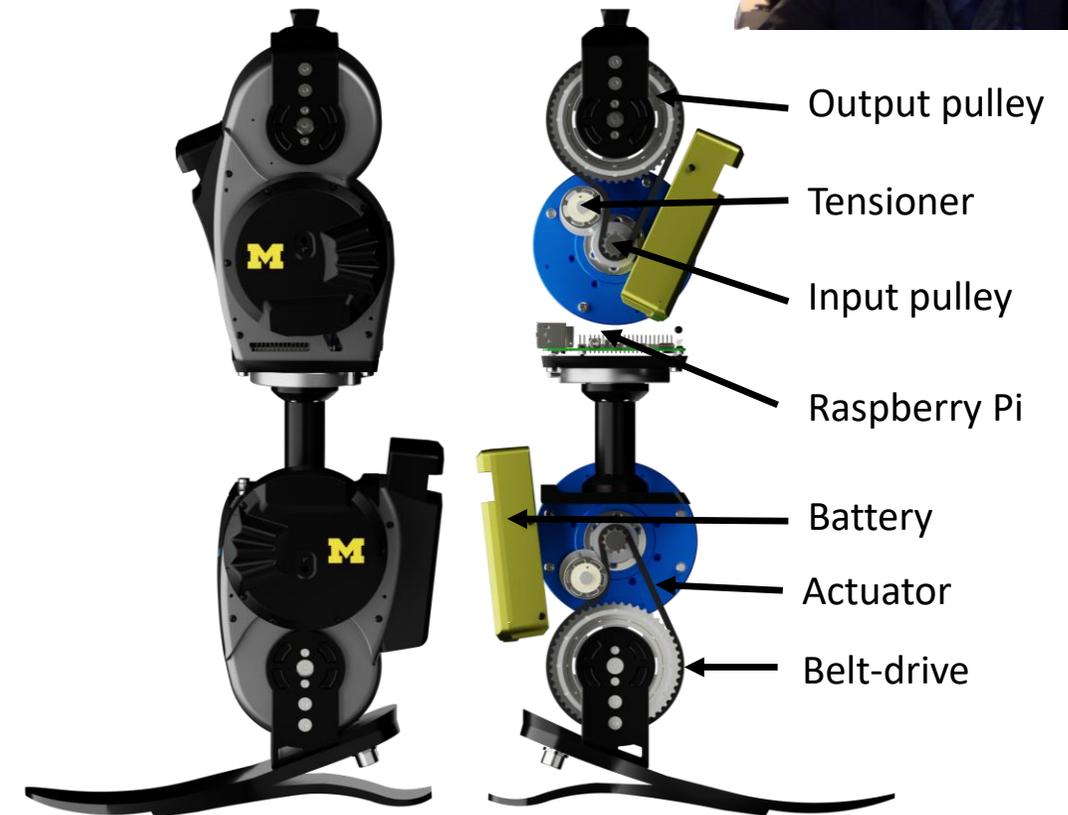
2nd Generation Version
Open-Source Robotic Leg

Dissemination

- Developed project website
  - Specifications
  - Solid model files
  - Bill of materials
  - Manufacturing instructions
  - Step by step assembly instructions
  - Open-source data

- Website receives ~500 unique visitors / month
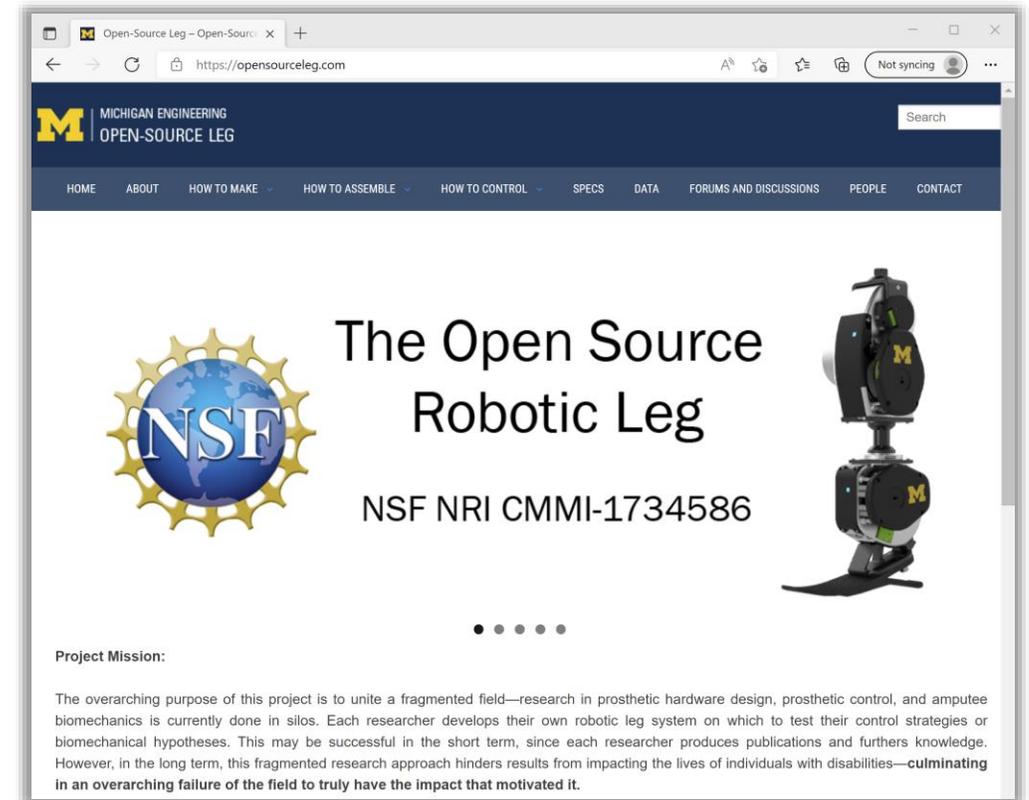
www.opensourceleg.com

Broader impacts

Broader impacts

Dissemination in trade magazines

Dissemination in popular media

Thank you

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