

Vanderbilt University CREATE

Center for Rehab. Engineering & Assistive Tech.



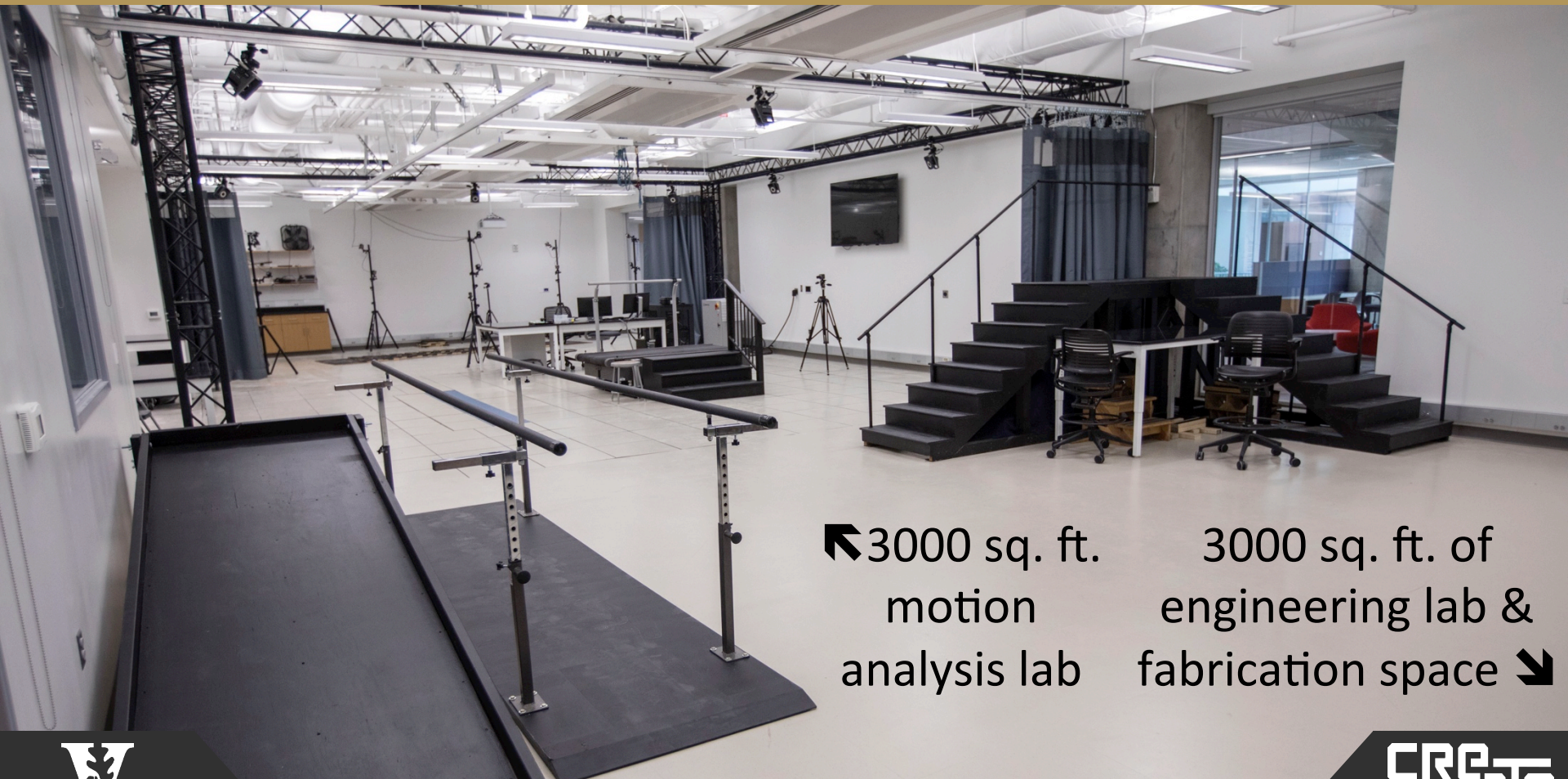
VANDERBILT[®]
SCHOOL OF ENGINEERING

Rehabilitation Engineering

**Goal: restore mobility, independence & health
to individuals with disabilities through
advances in science and technology**



CENTER FOR
**REHABILITATION ENGINEERING
+ ASSISTIVE TECHNOLOGY**



↖ 3000 sq. ft.
motion
analysis lab

3000 sq. ft. of
engineering lab &
fabrication space ↘

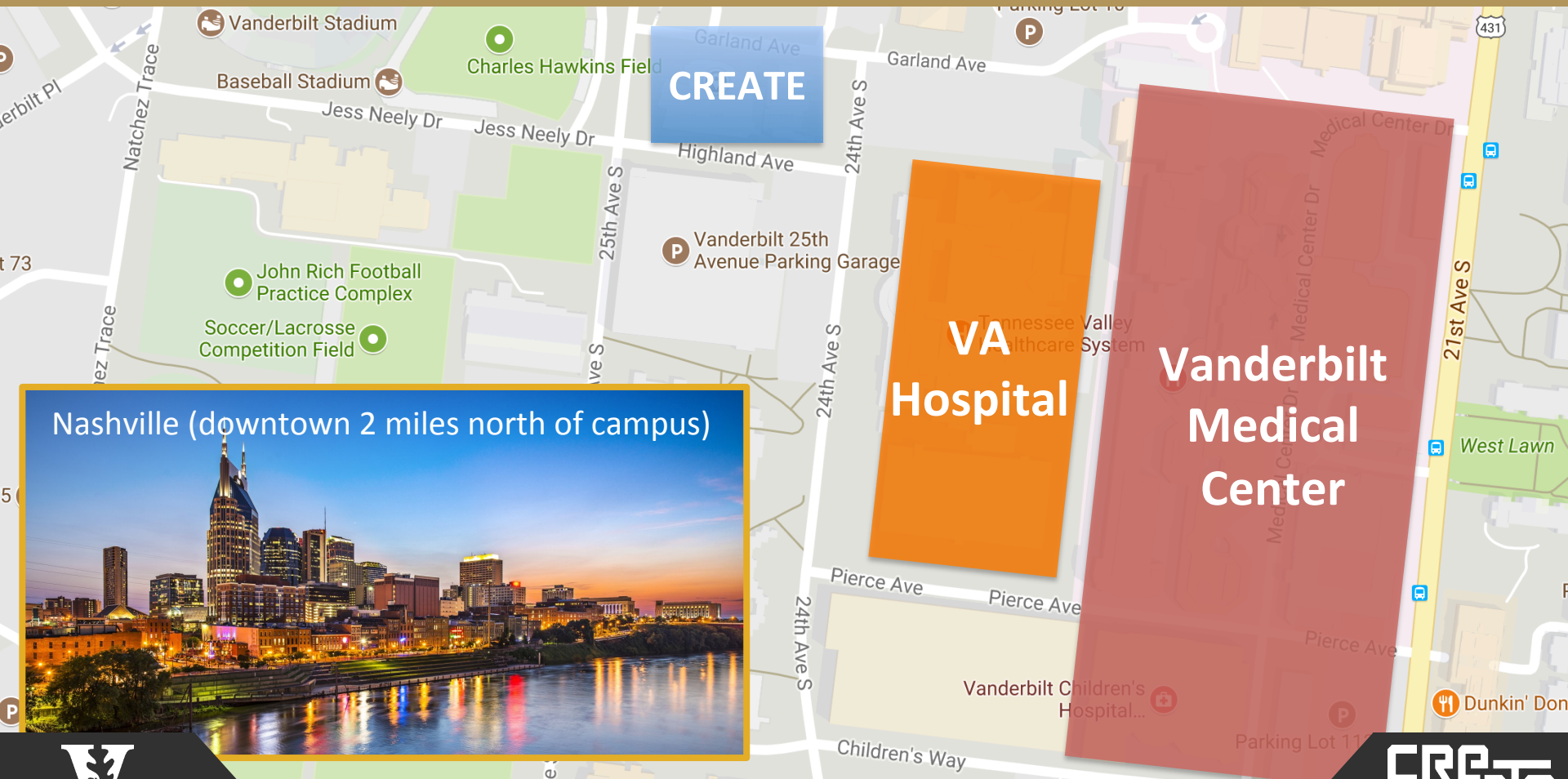


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CENTER FOR REHABILITATION ENGINEERING + ASSISTIVE TECHNOLOGY



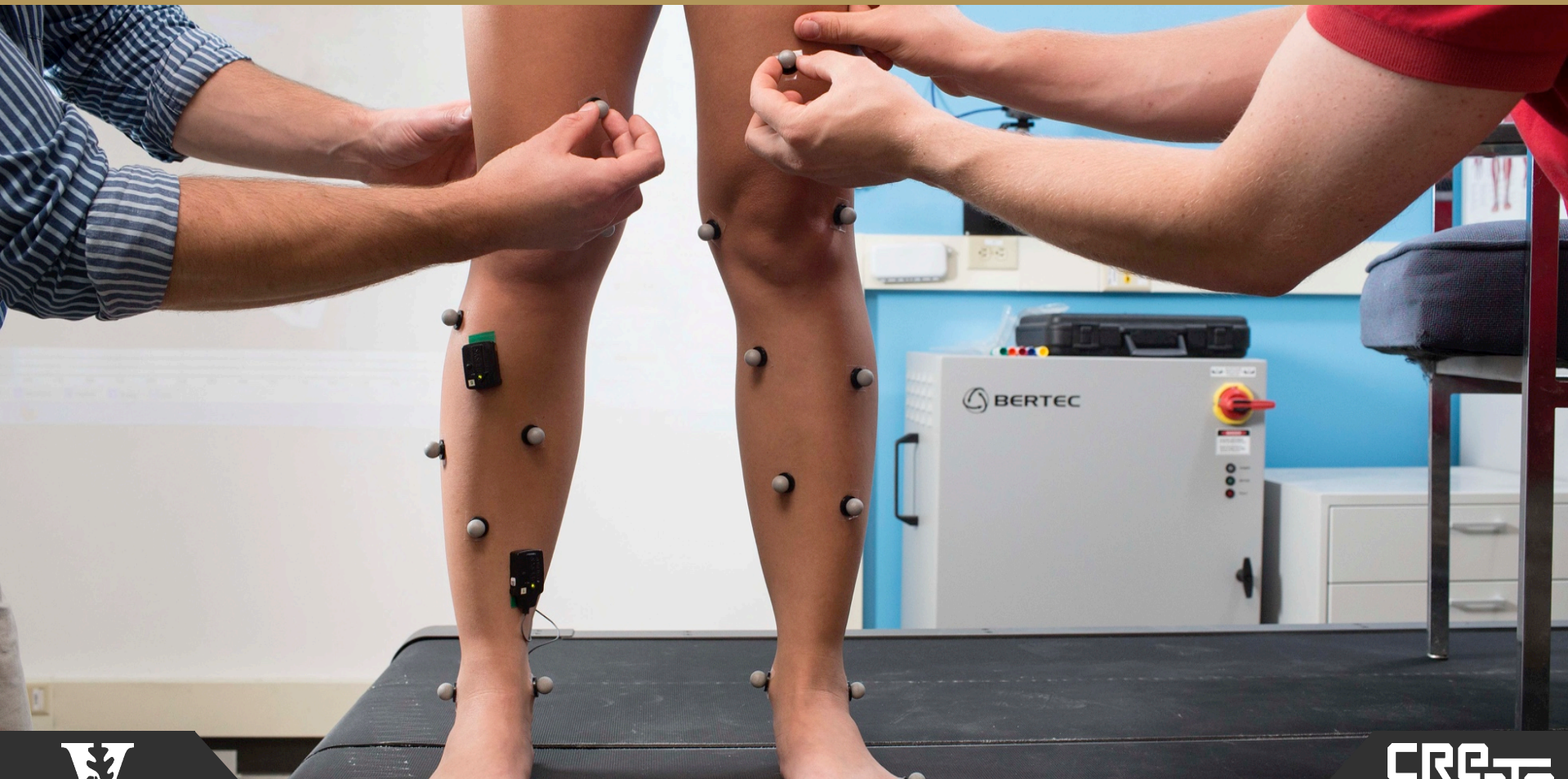
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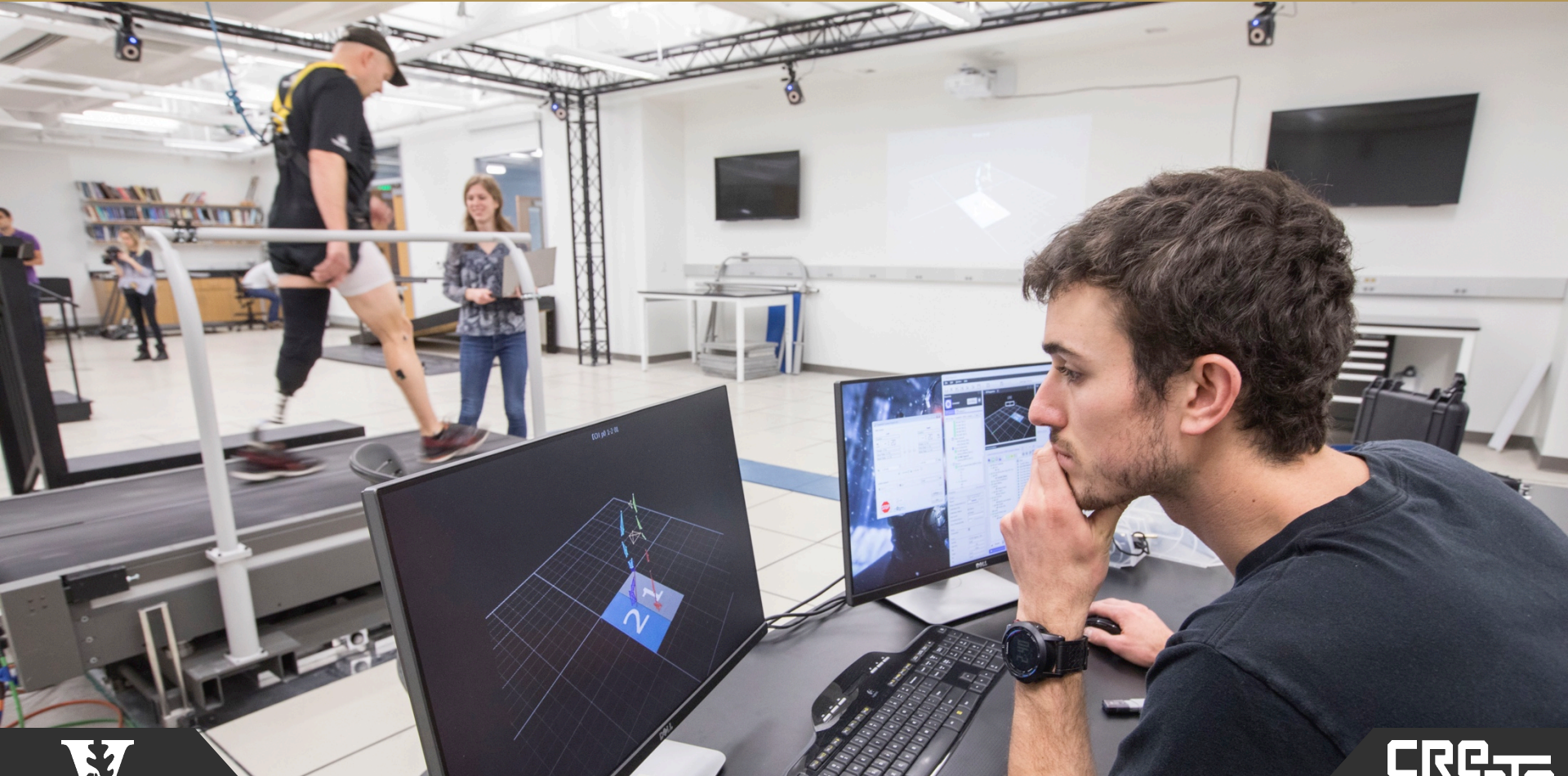
1. Studying the science of human movement (biomechanics)



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2. Developing assistive tech (prostheses, exoskeletons, smart clothing)



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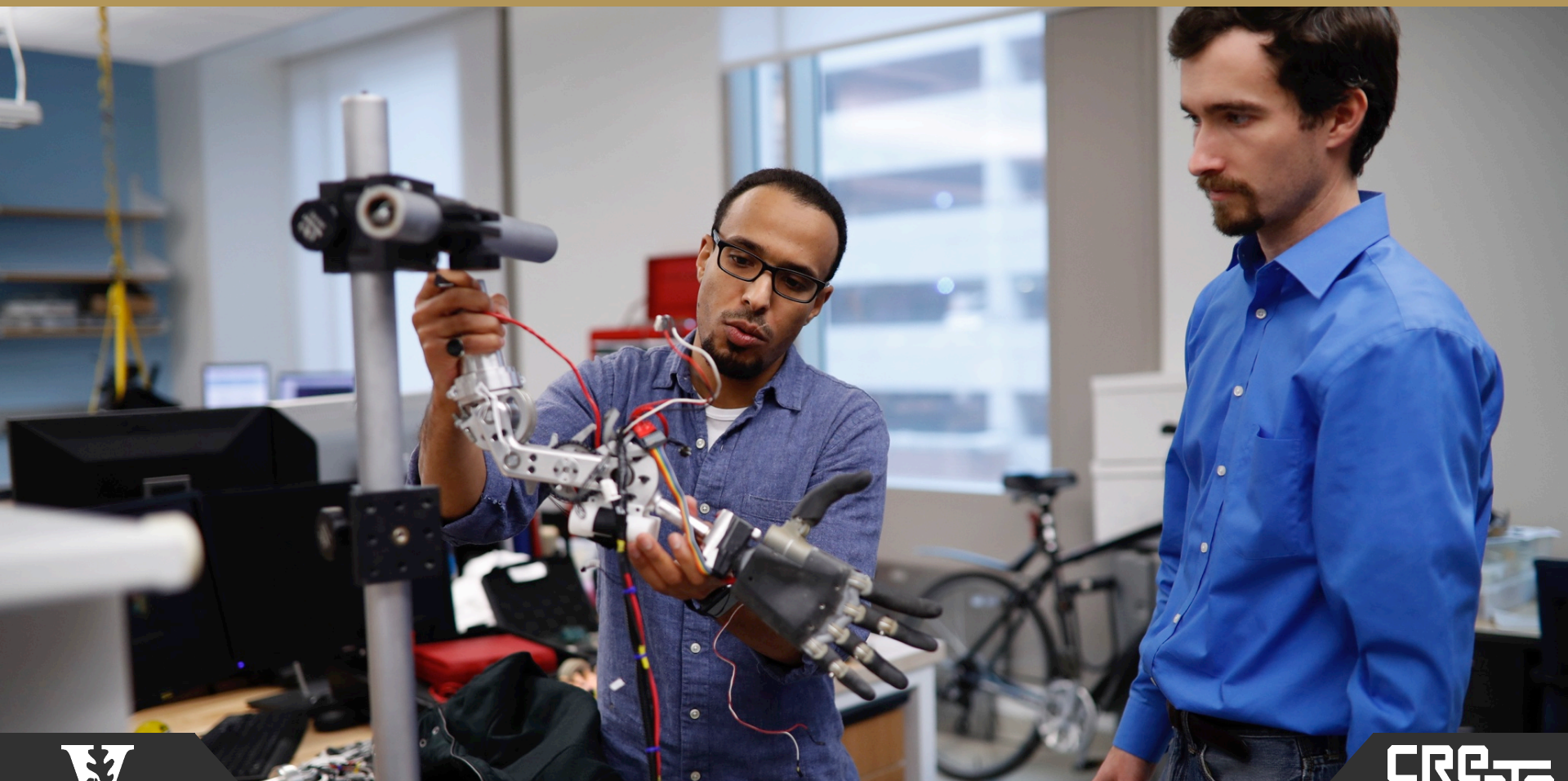
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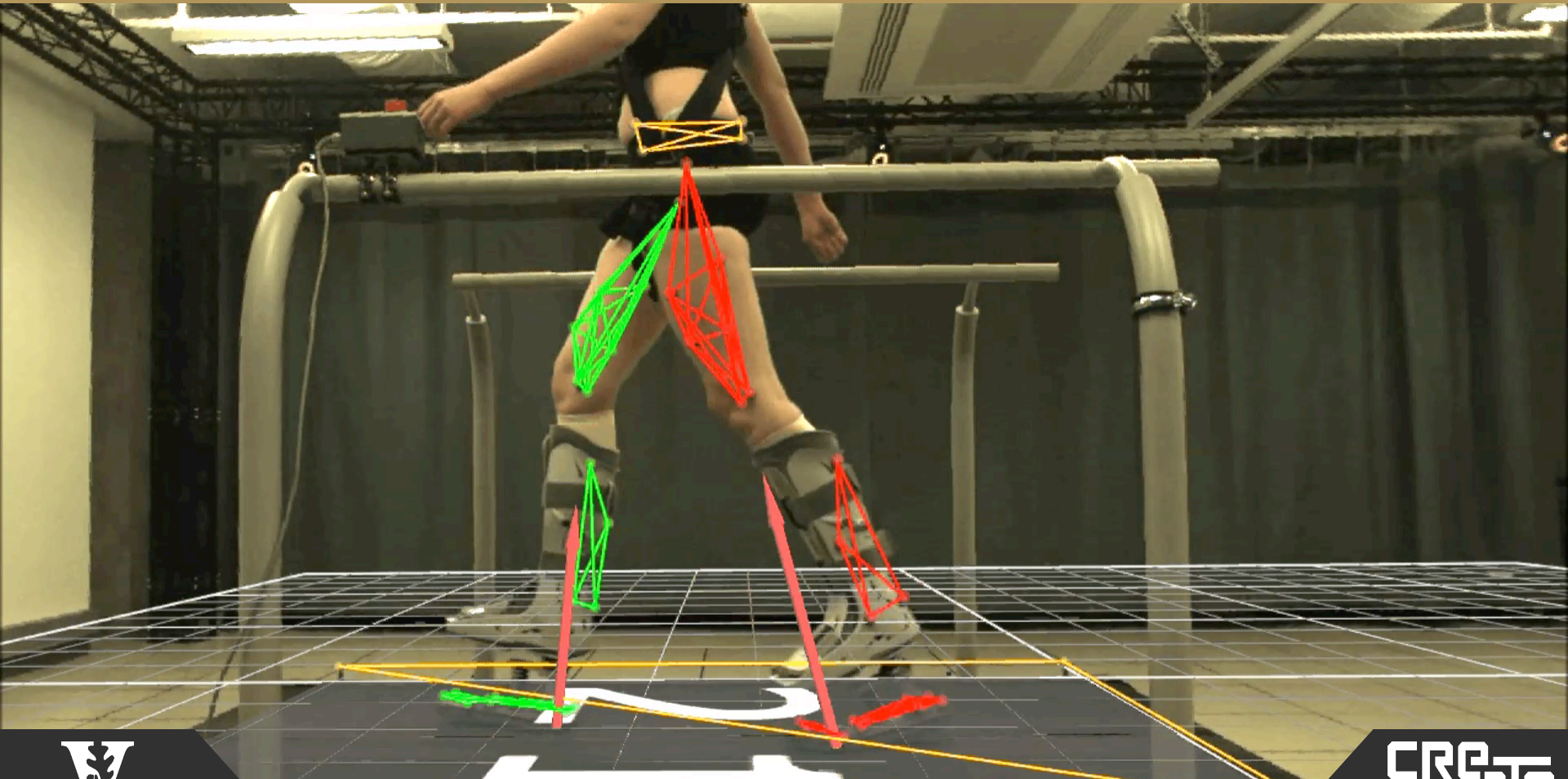
2. Developing assistive tech (prostheses, exoskeletons, smart clothing)



3. Performing experiments to measure benefits & refine devices



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4. Training next generation of engineers, scientists & innovators



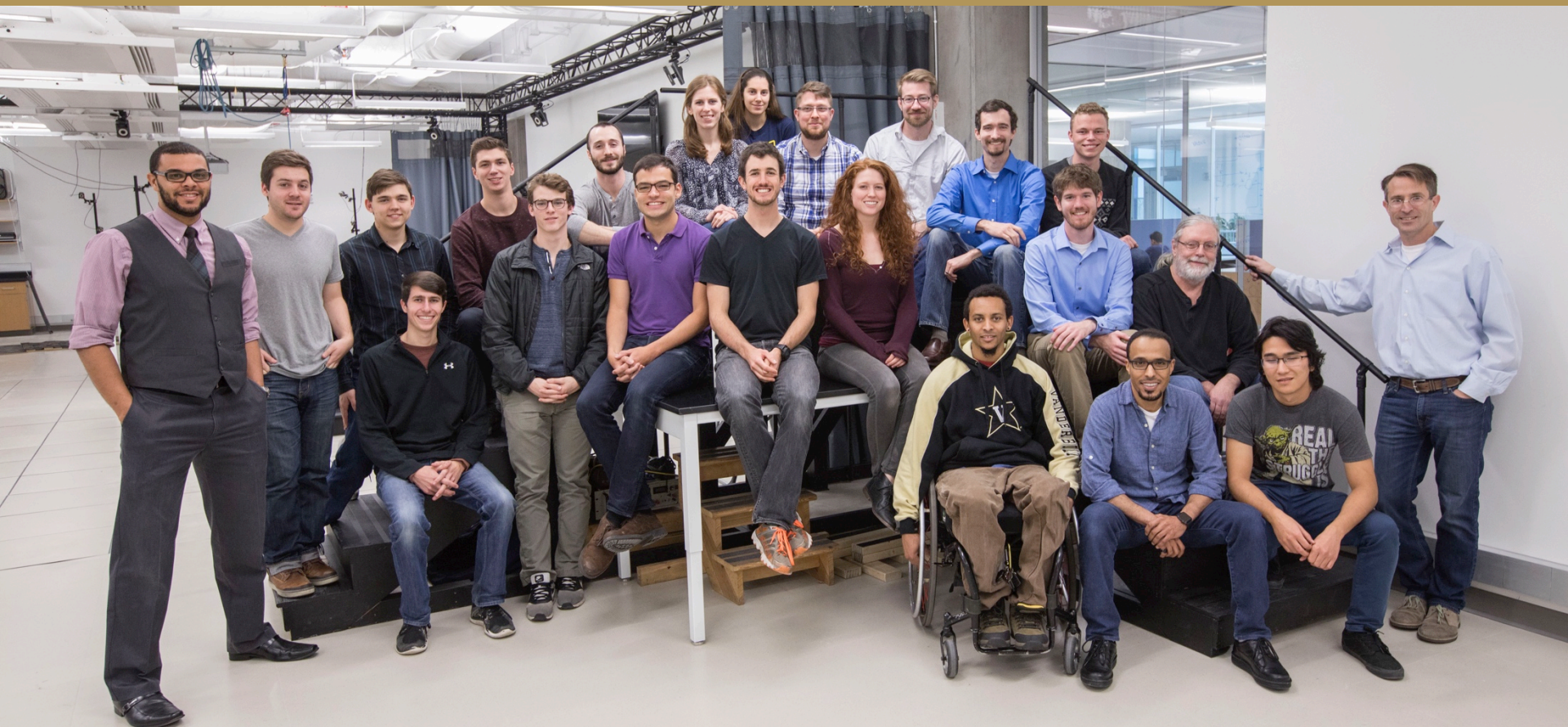
4. Training next generation of engineers, scientists & innovators

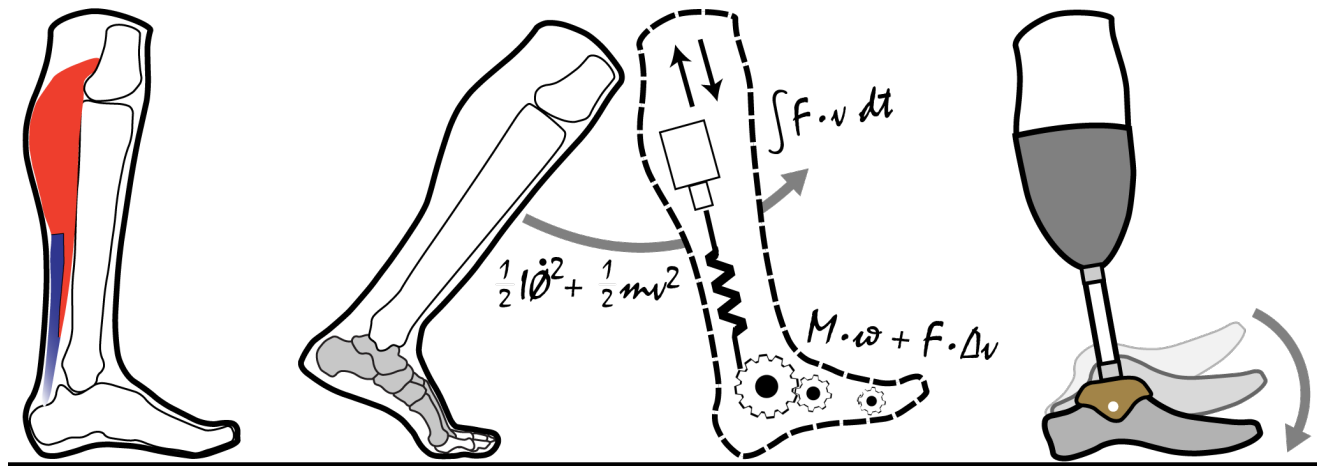


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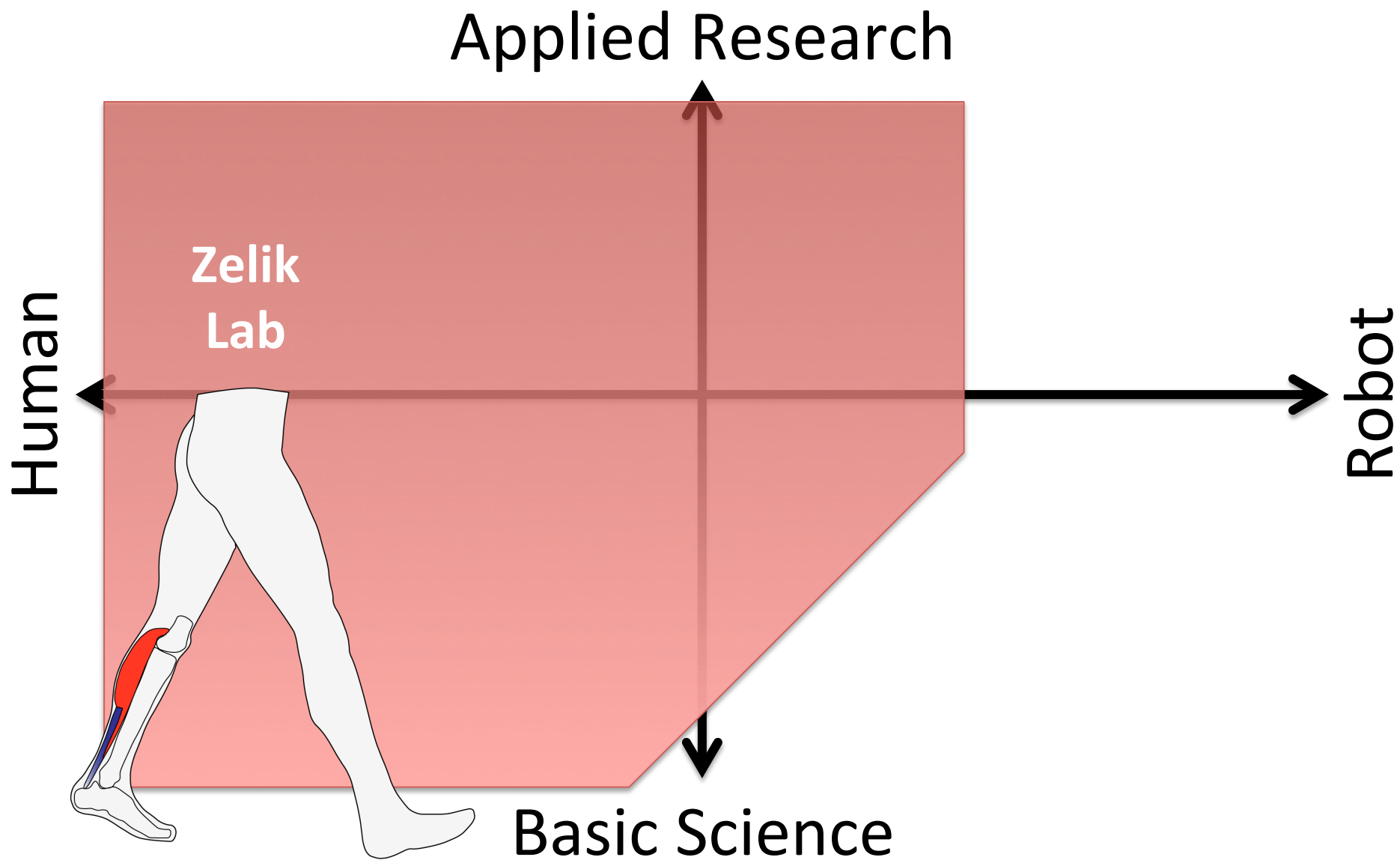




Research Groups Within CREATE

Zelik & Goldfarb Labs





Applied Research

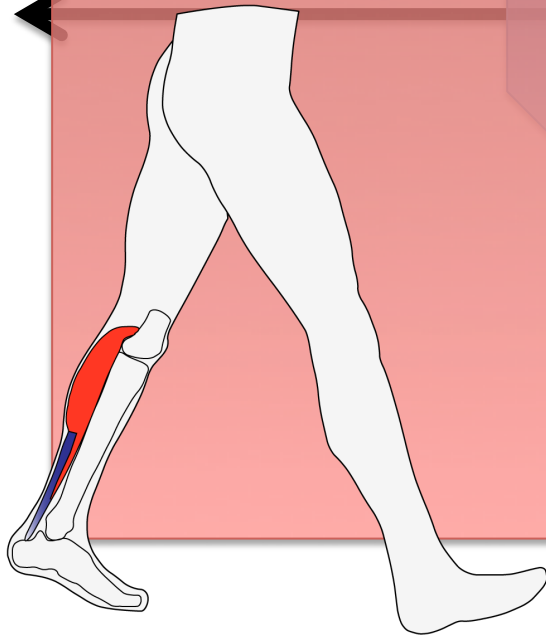
Zelik
Lab

Goldfarb
Lab

Human

Robot

Basic Science



Applied Research

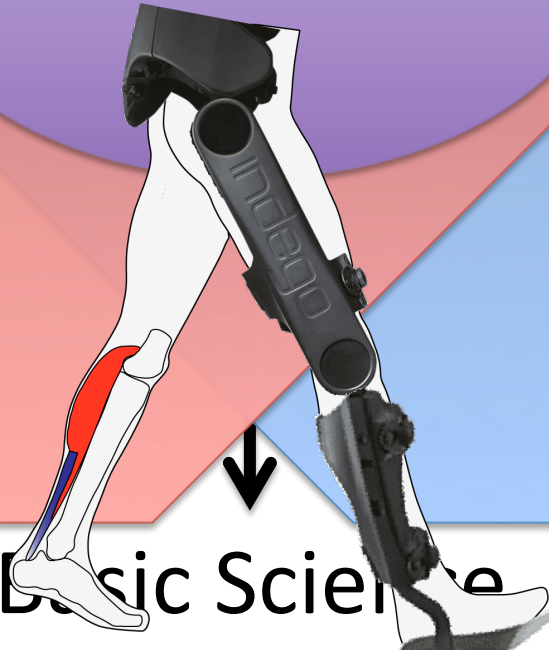
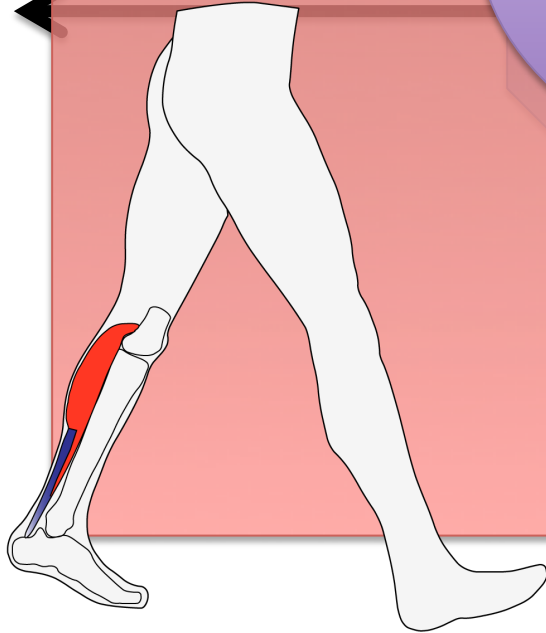
Zelik
Lab

Human Augmentation
& Assistive Technology

Goldfarb
Lab

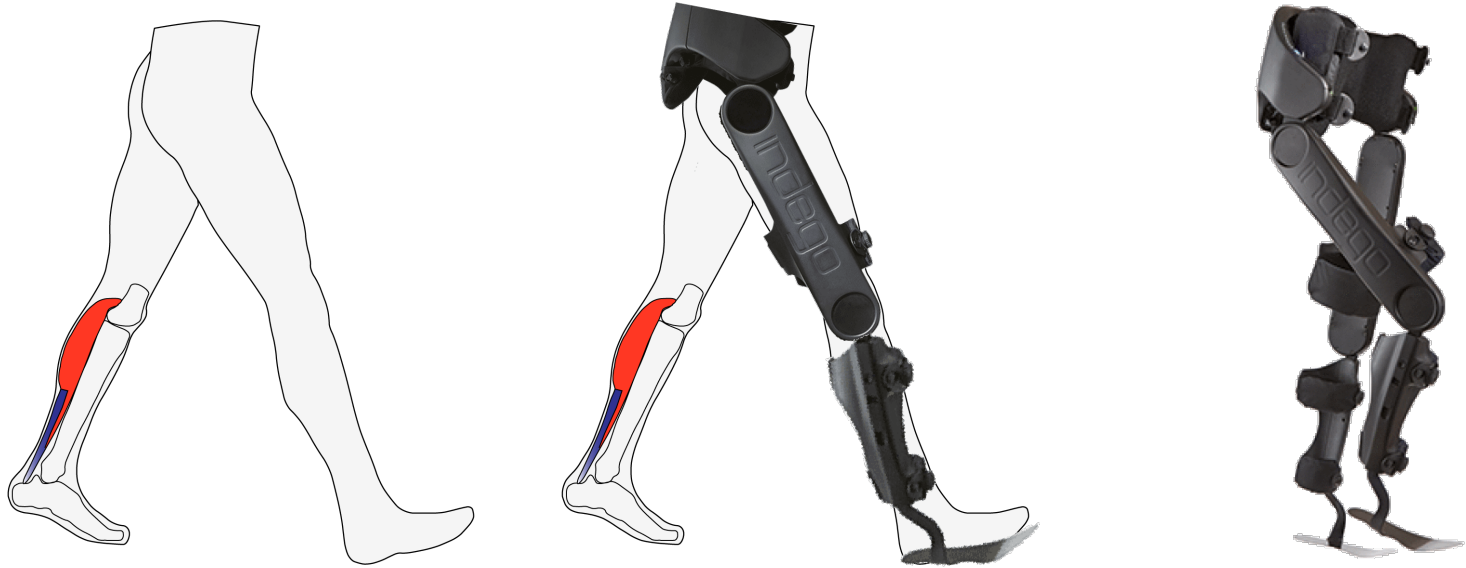
Human

Robot

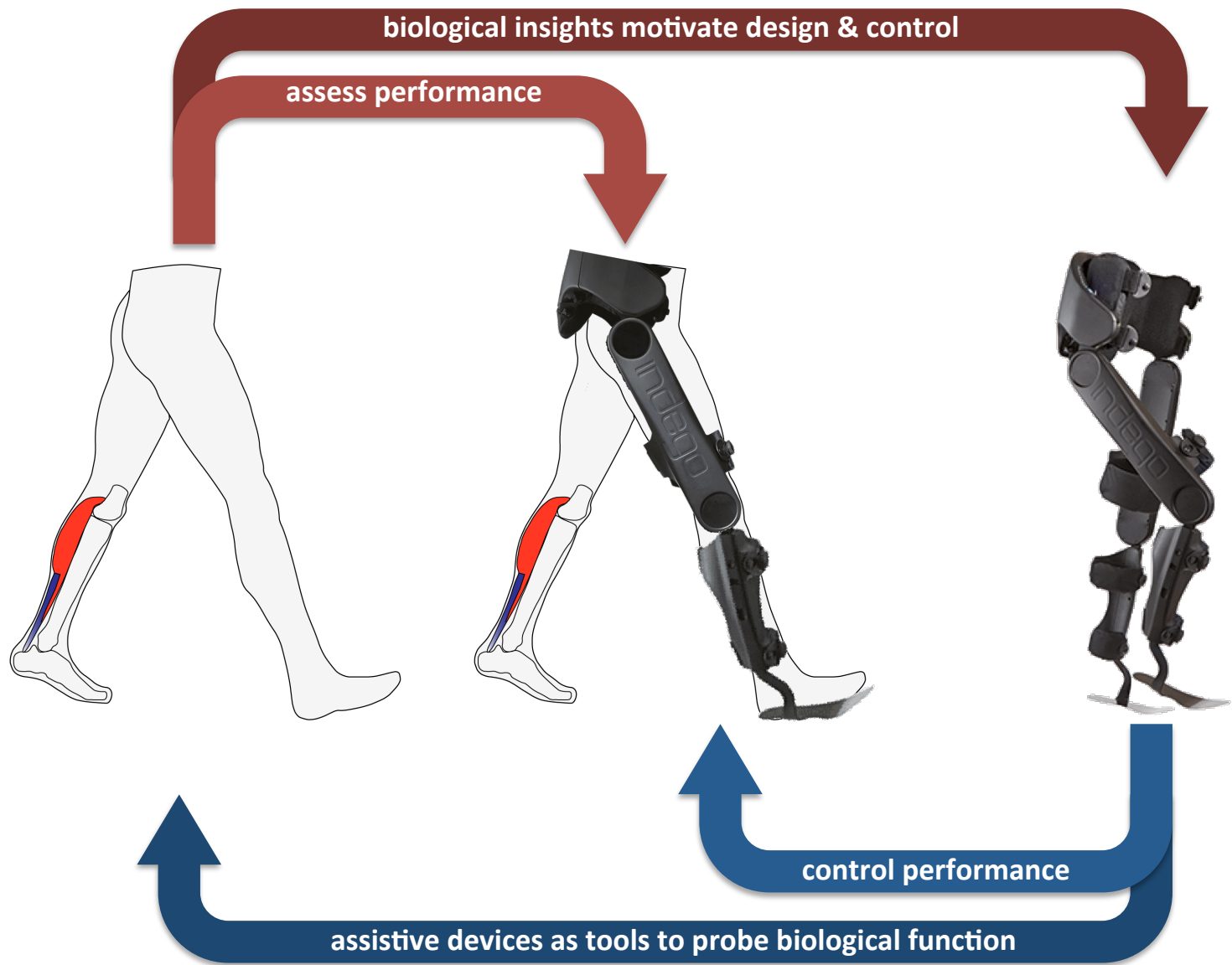


Basic Science

biological insights motivate design & control



assistive devices as tools to probe biological function



CREATE extended family (VUMC clinical collaborators)



**Gerasimos Bastas,
MD, PhD**
(care for prosthetic
users)



**Leon
Scott, MD**
(orthopedics, stress
fracture)



**Stacy
Stark, DO**
(pediatrics, cerebral
palsy)

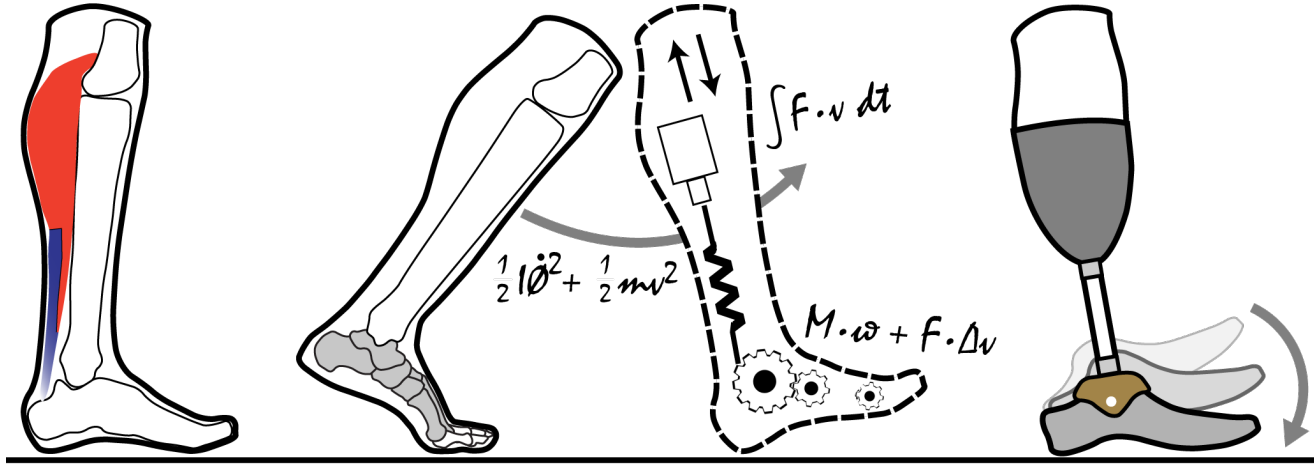


**Chrissy
Durrough, PT, DPT, NCS**
(spinal cord injury)



**Aaron
Yang, MD**
(low back pain,
rehabilitation)










Zelik Lab

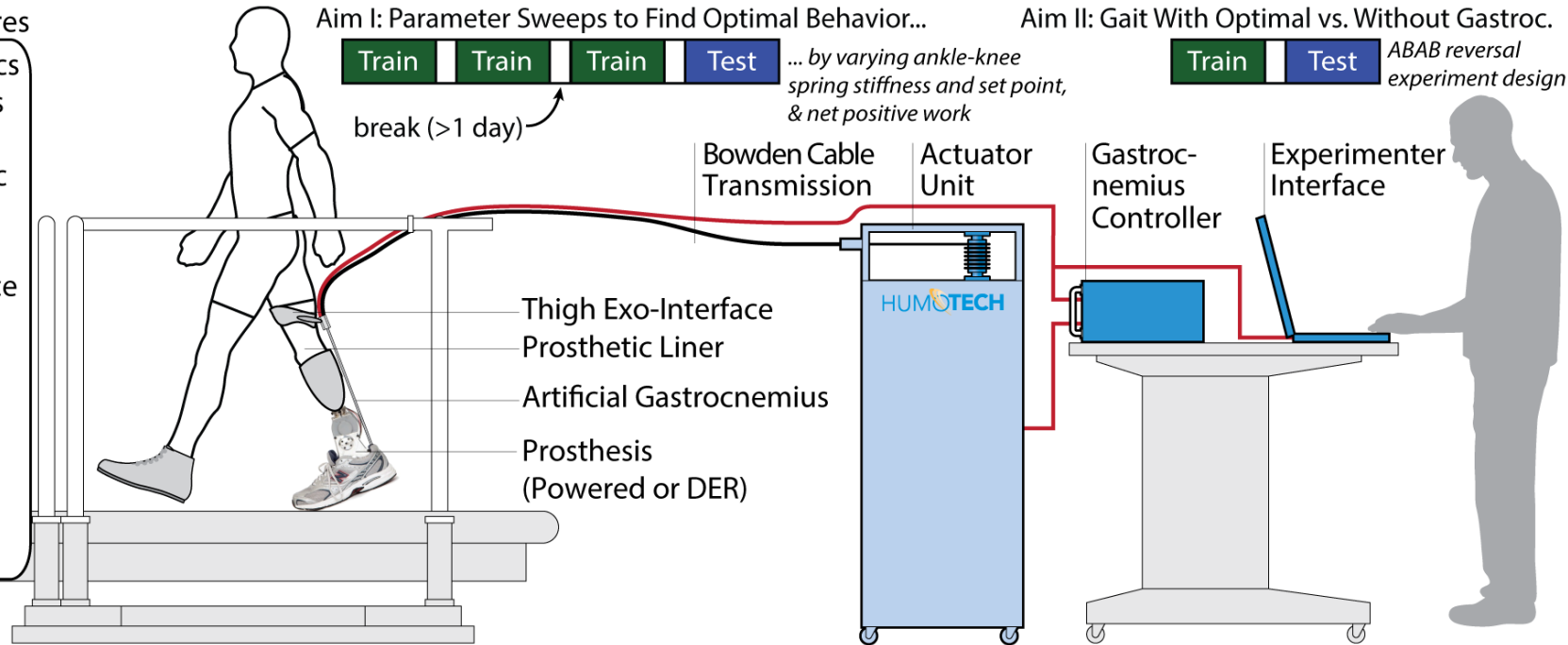
Research Projects for Prospective PhD Students (Fall 2018)



Restoring bio-inspired ankle-knee coupling for prosthetic users

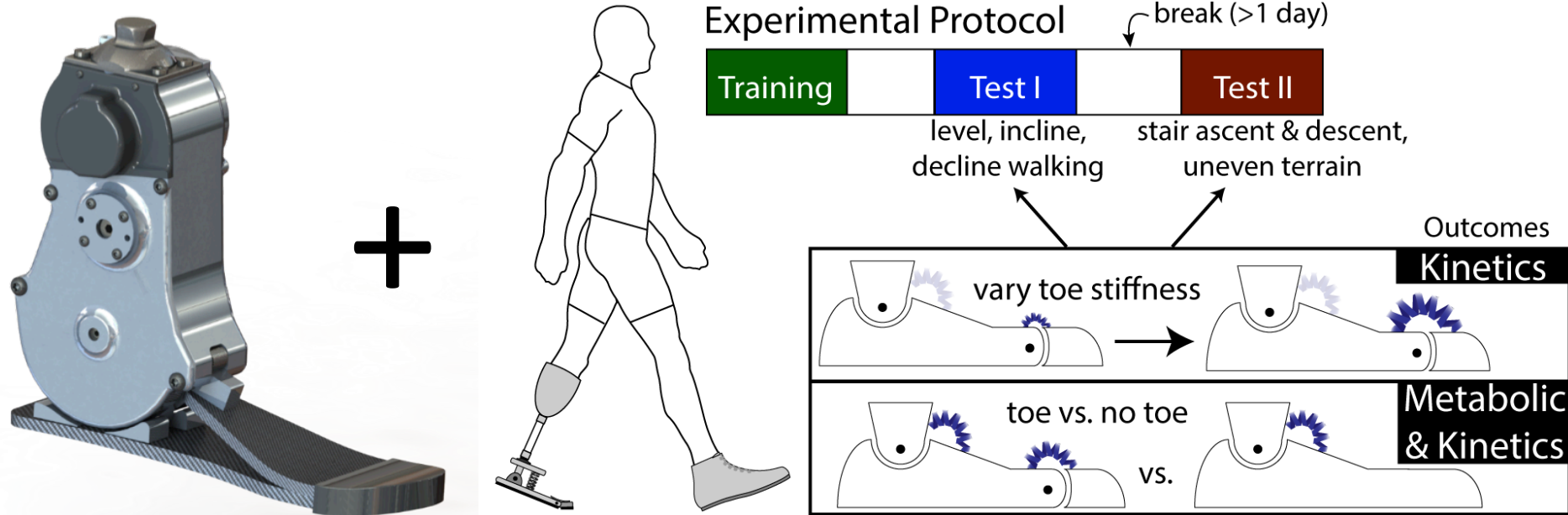
Outcome Measures

-  Kinematics & Kinetics
-  Metabolic Rate
-  Preference Survey
-  Ground Reaction Forces
-  Muscle Activity



Lab-based robotic actuator + prosthetics + biomechanics → enhance how assistive power is transmitted from the device to user, & better understand human ankle-knee muscles (gastrocnemius)

Using toe dynamics to improve powered & passive prostheses



Vanderbilt powered ankle prosthesis + enhanced foot/toe design + biomechanics → enhance ambulation for prosthetic users on inclines, stairs and uneven terrain, & better understand biological ankle-foot dynamics