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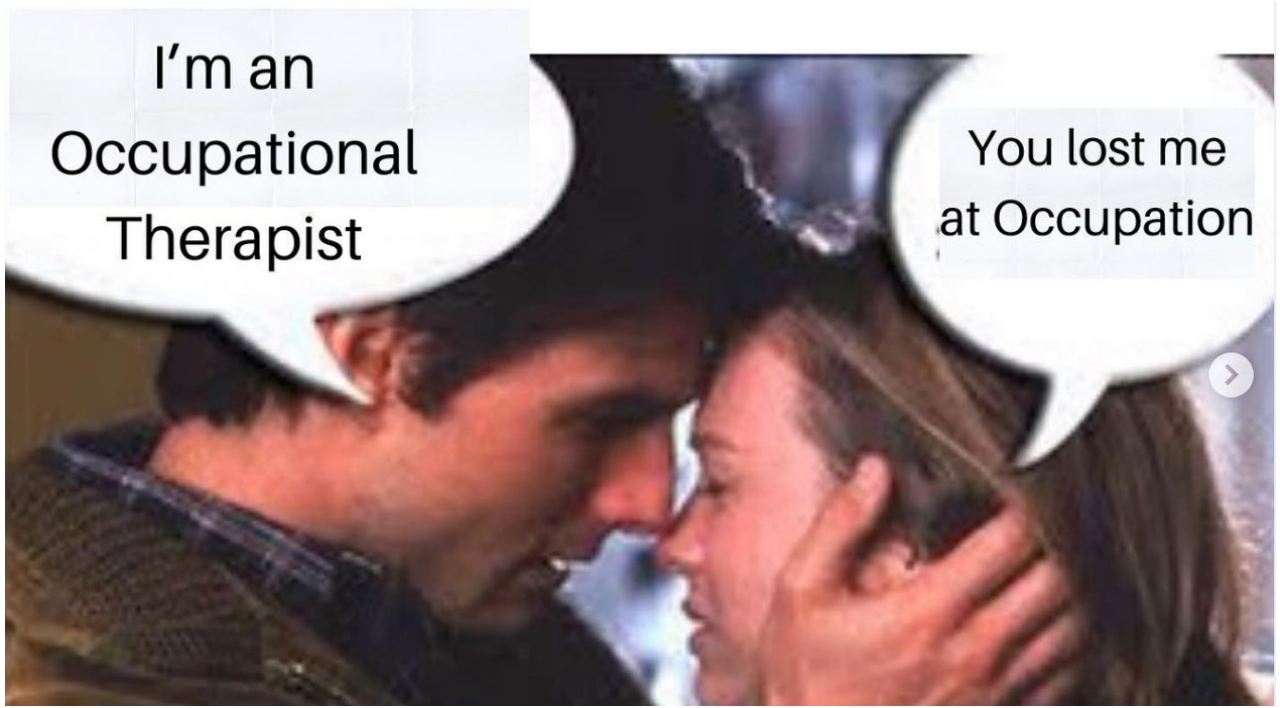
Living Life to Its Fullest with Stretch

V Nguyen, OTD, OTR/L
OT Clinical Research Lead

www.hello-robot.com


I'm an Occupational Therapist
You lost me at Occupation

WWII Era

An OT works with a man with a prosthetic arm performing work-related tasks(1952)

Woodworking on a machine (1957)

DOMAIN
Occupations
Contexts
Performance Patterns
Performance Skills
Client Factors
Intervention
Outcomes
Evaluation
Achieving health, well-being, and participation in life through engagement in occupation.
PROCESS

Aspects of the Occupational Therapy Domain

Occupations	Contexts	Performance Patterns	Performance Skills	Client Factors
Activities of daily living (ADLs) Instrumental activities of daily living (IADLs) Health management Rest and sleep Education Work Play Leisure Social participation	Environmental factors Personal factors	Habits Routines Roles Rituals	Motor skills Process skills Social interaction skills	Values, beliefs, and spirituality Body functions Body structures

Seeing the Whole Person

An Occupational Therapy Approach

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An Interdisciplinary Team

Aaron Edsinger
CEO

Charlie Kemp
CTO

Binit Shah
Software Lead

Blaine Matulevich
Engineering

Mohamed Fazil
Robotics Software Engineer

V Nguyen
OT Clinical Research Lead

Anna Garverick
Robotic Applications Engineering Intern

Alan G. Sanchez
Robotics Engineer Intern

Chintan Desai
Software Development Intern

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Summer 2022 Team

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Khan Professor of Applied Health Sciences

Harshal Mahajan
Assistant Director of Research at LIFE Home

Samuel Olatunji
Postdoctoral Research Associate

Megan Bayles
Graduate Research Assistant

Megan Bily
Undergraduate Research Assistant

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Henry and Jane Evans
Robots for Humanity

Maya Cakmak
Associate Professor of Computer Science

Graduate Research Assistants

Nick Walker

Vinitha Ranganeni

Research Interns

Kavi Dey

Brian Yao

Joe Sluis

Meet Henry and Jane Evans

Henry Evans

Courtesy of the Evans Family

Age: 60
Height: 6”4
Race: White
Sex: Male
Language(s): English
Glasses: Yes
Medical Condition: Basilar Artery Dissection; brainstem stroke; quadriplegia; non-speaking
Abilities: Cognition & sensation intact, slight left thumb flexion; functional neck mobility; expert robotics' user
Level of Assistance: Dependent in all activities of daily living (ADL) and majority of his instrumental ADL (IADL)
Technology Use: Computer, head tracker, mouse, telepresence robots, AutoBed
Roles: Family man, loving husband, advocate, car enthusiast, international speaker
Occupations: Playing cards, writing songs, socialization, watching YouTube, working, going outside

Jane Evans

Courtesy of the Evans Family

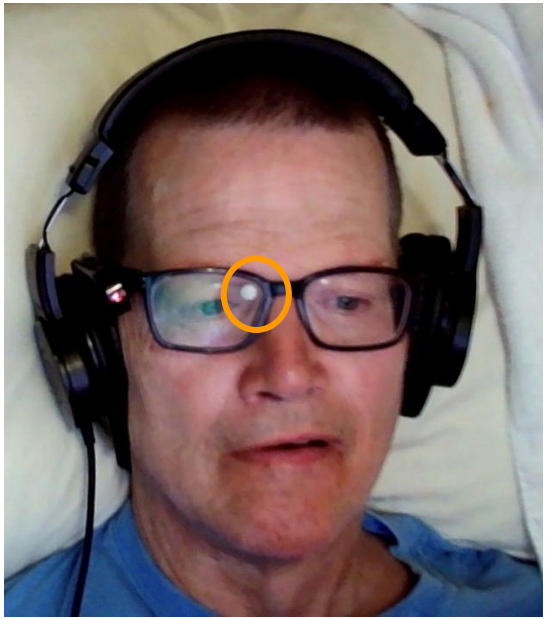
Age: 59
Height: 5”3
Race: Peruvian, German, Chinese
Sex: Female
Language(s): English, French
Glasses: Yes
Abilities: Letter board master, super-human
Level of Assistance: Independent
Roles: Extraordinary mother, wife, and care partner; advocate; speaker
Technology use: Smart Phone, Alexa, computers, some robotics
Occupations: Cooking, hiking, reading, writing, fishing

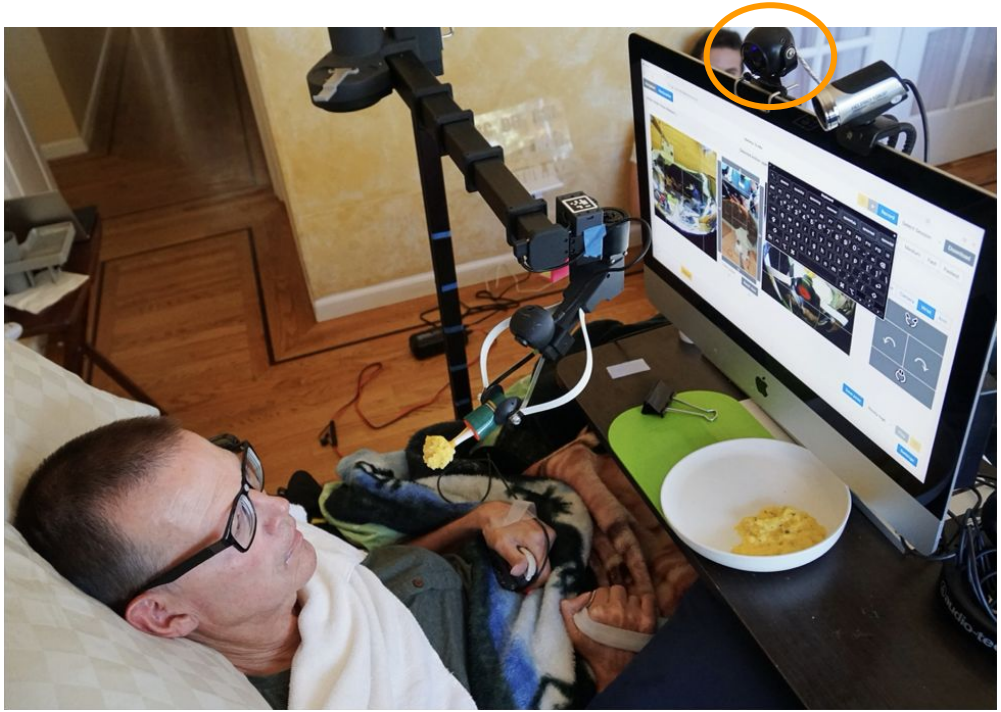
Power Couple

Evans Family

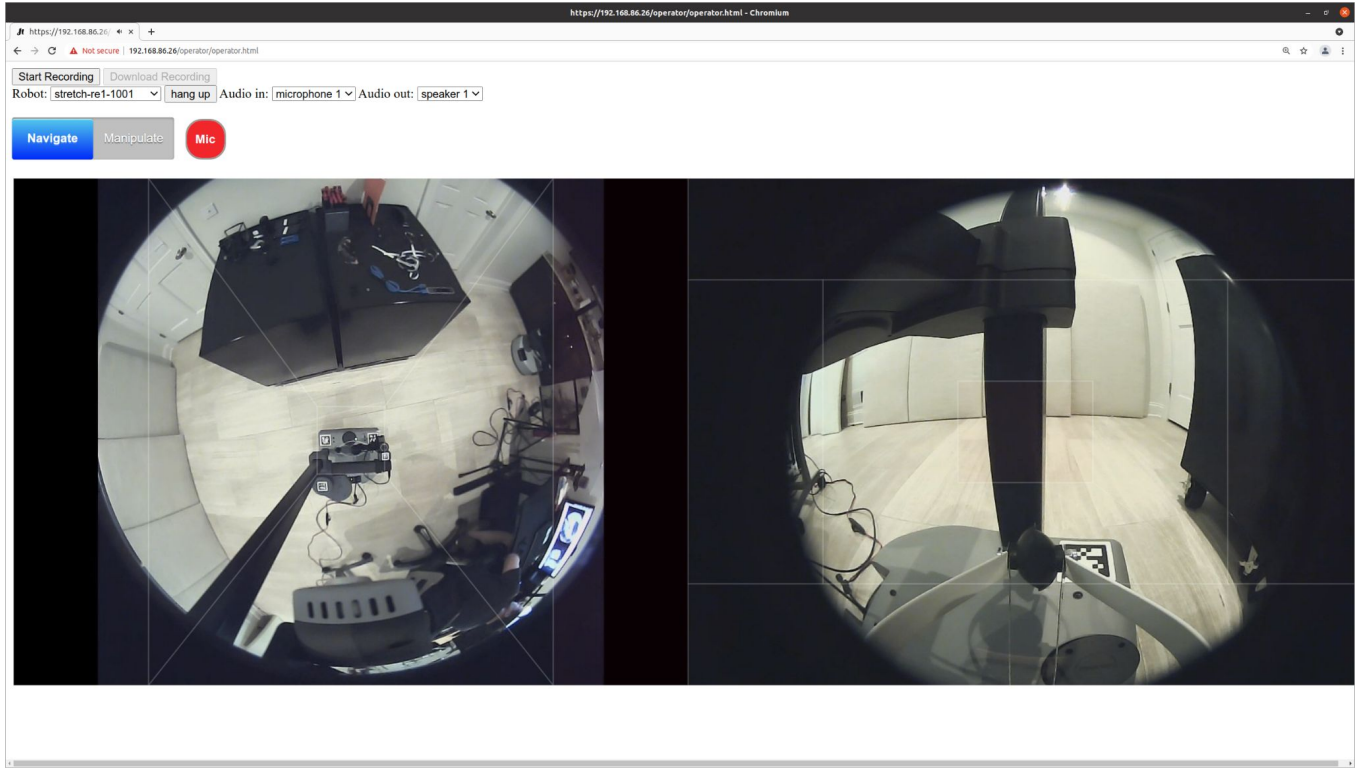
Henry Evans

Computer-use

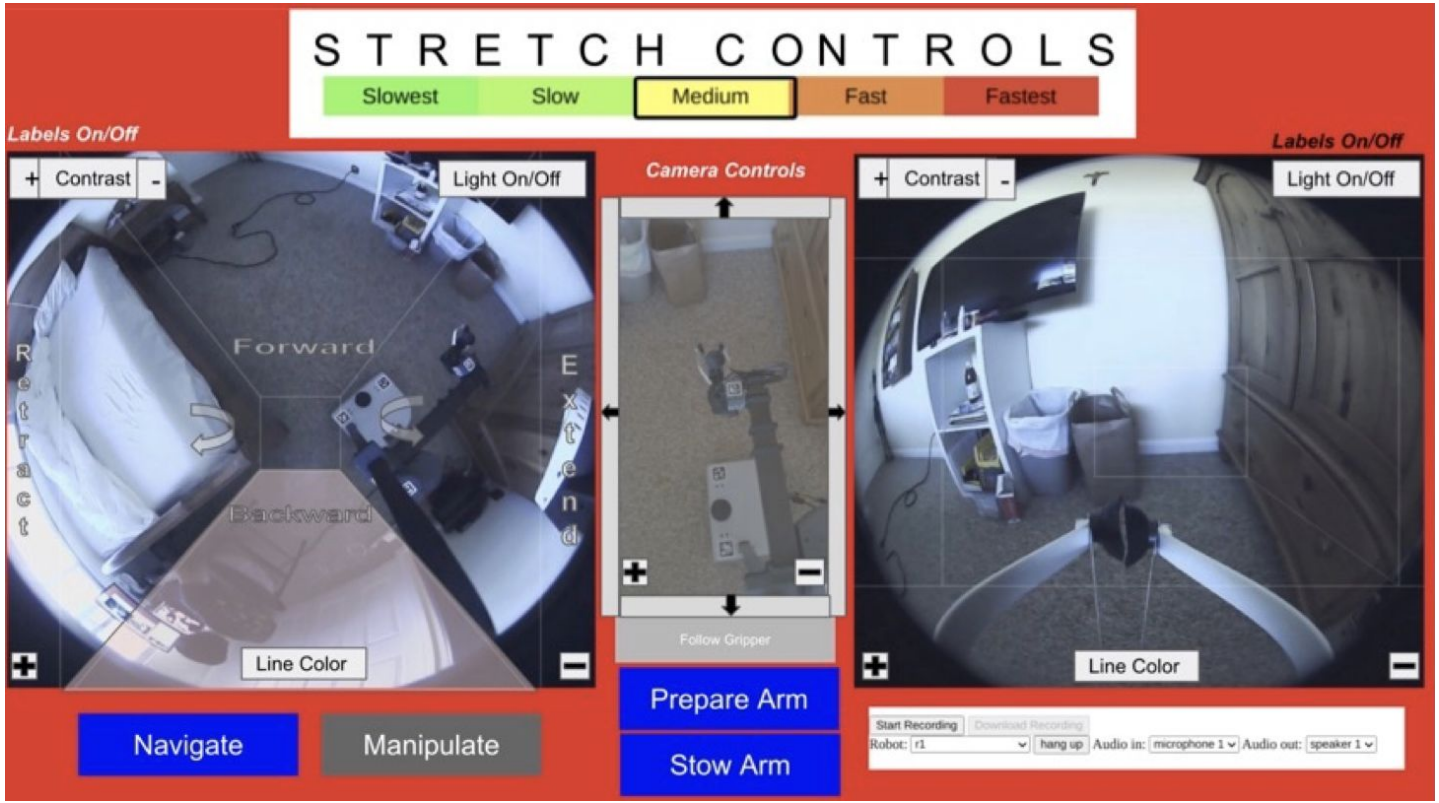




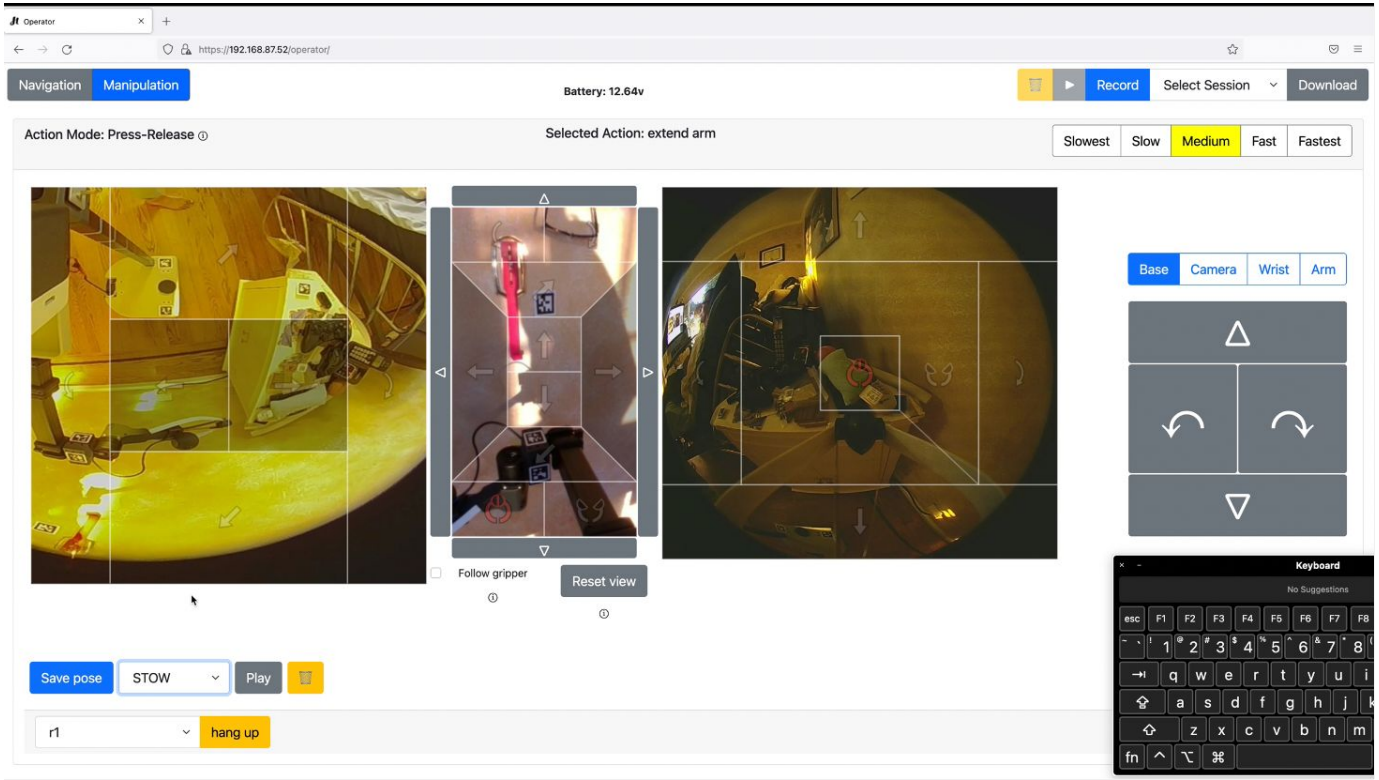
Web-interface to Operate Stretch (2021)



Henry's Design



Updated Web-interface



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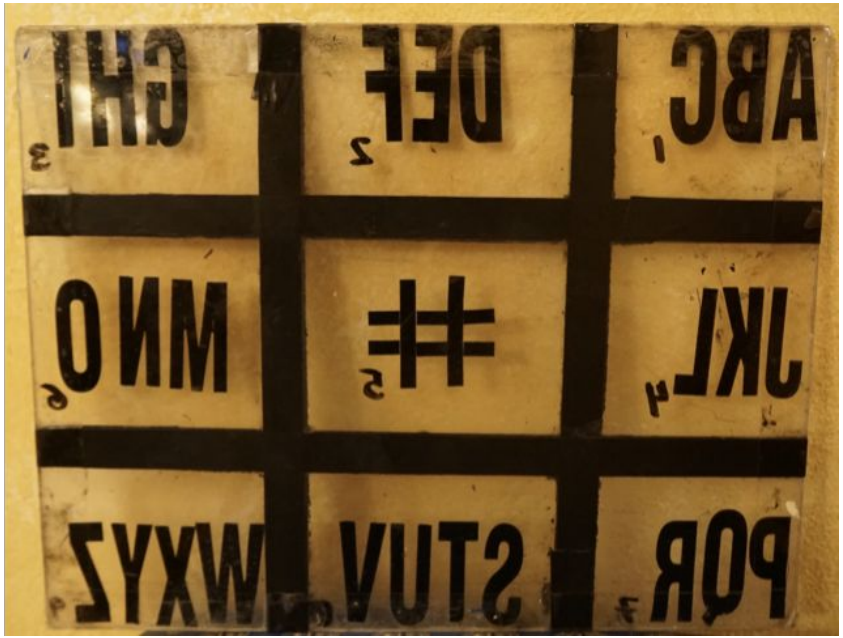
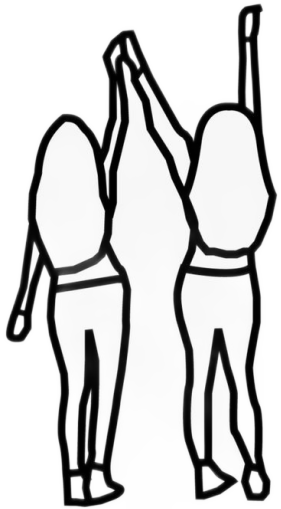
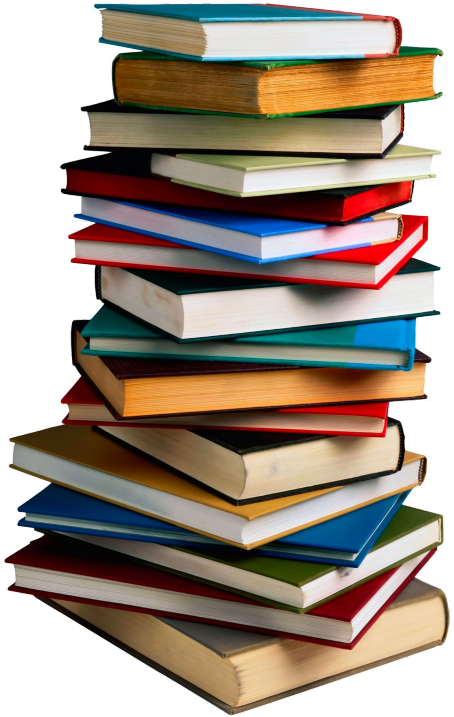
Letter Board



Jane Evans

Leisure Interests





Care Partner Role

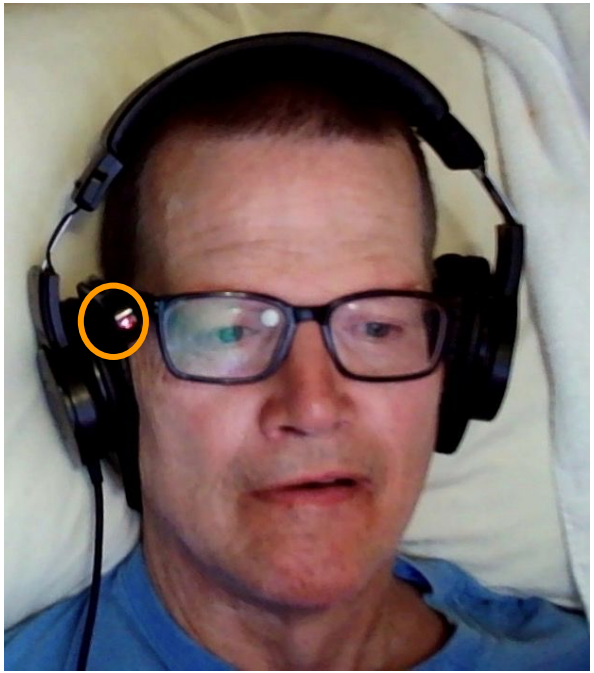
Transferring into the wheelchair

The Caregiver Principle

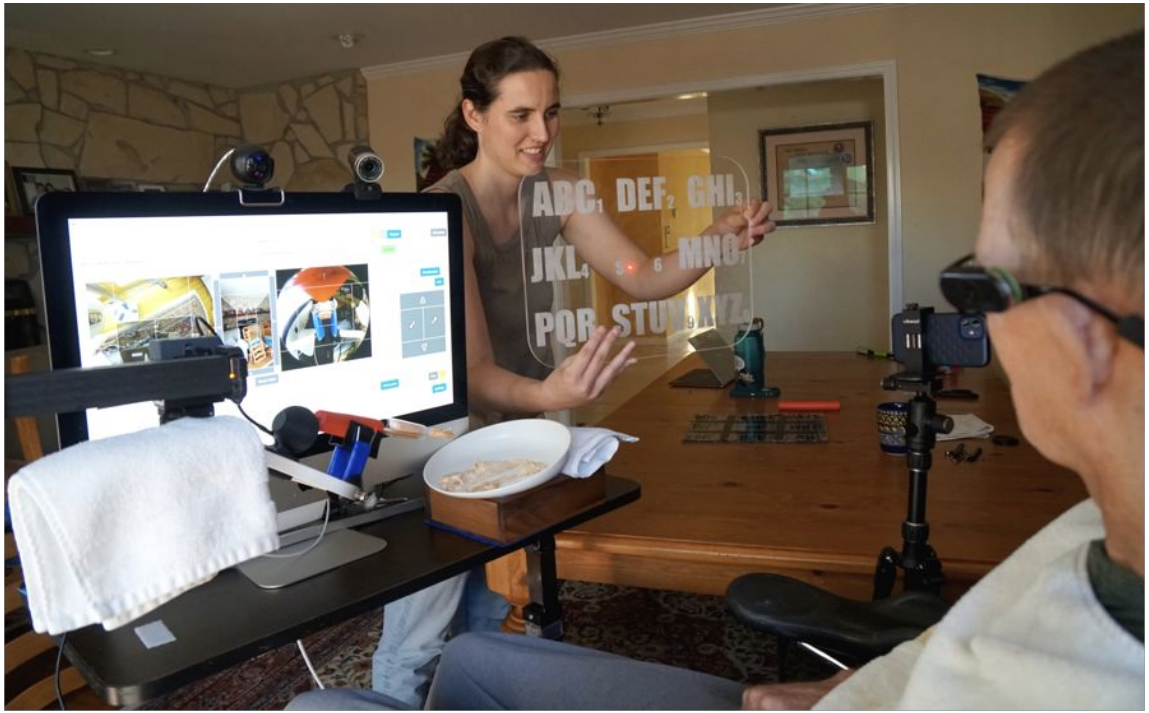
“No matter how much assistance a device provides to a [adult] patient, it will not be used regularly unless it also takes no time to either set up or use by the caregiver, and unless it makes the caregiver’s life, a lot easier.”

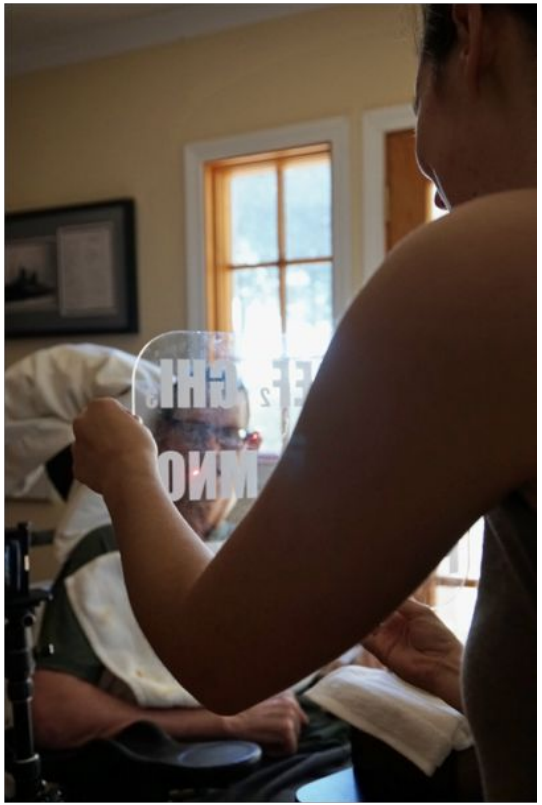
~Henry Evans

Laser-finger



Enabling the Individual





Voice Commands

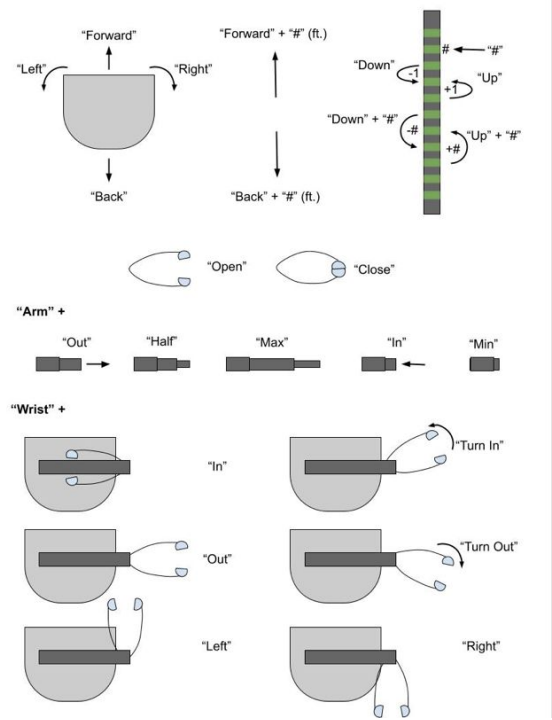
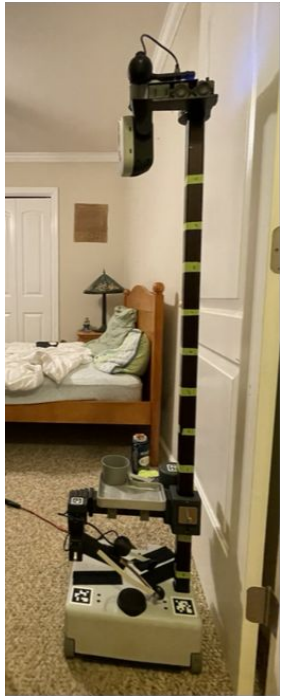


Illustration of voice commands



Visual & tactile cues

Voice Commands

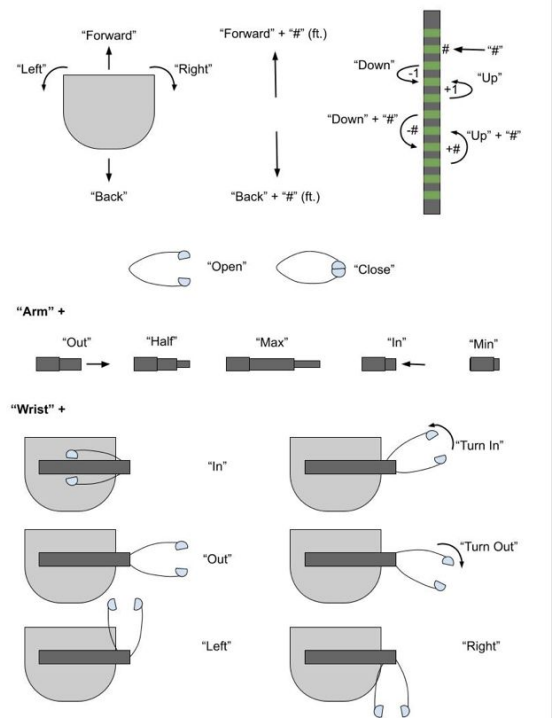
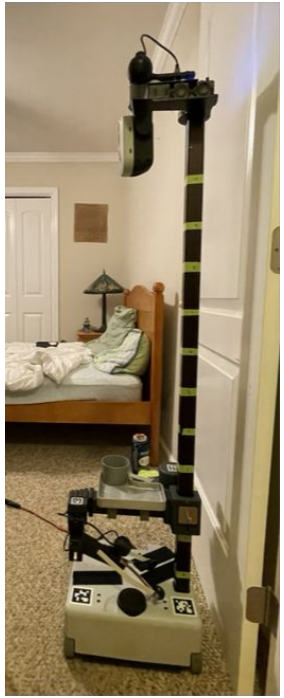


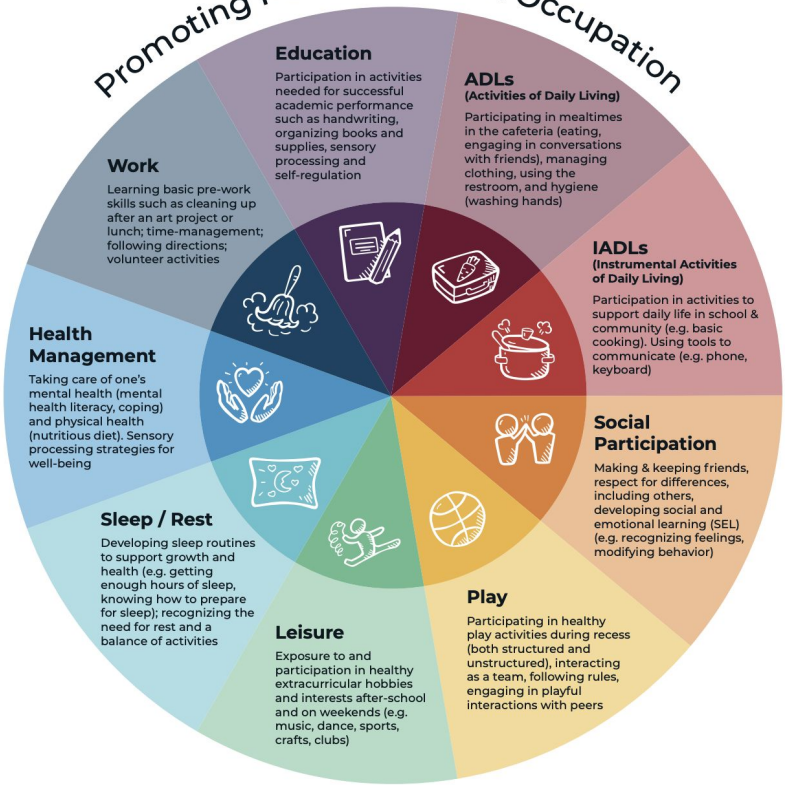
Illustration of voice commands



Visual & tactile cues

Real-time demo video

Occupational Therapy
Promoting Participation in Occupation



(2022) Bazyk, S.

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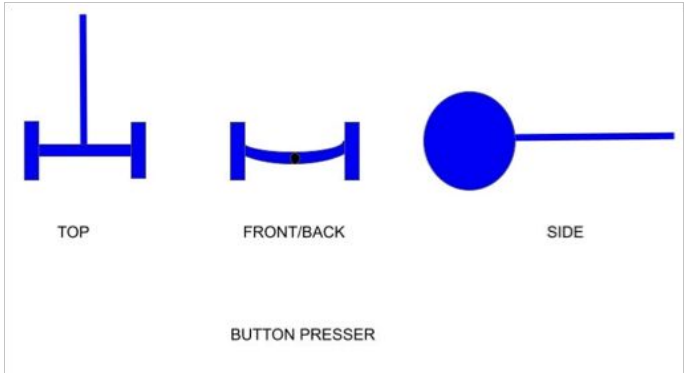
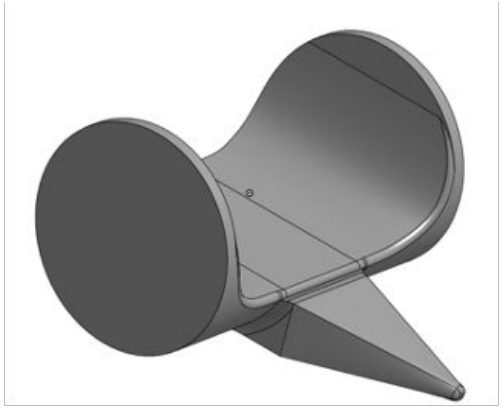
Promoting Independence and Satisfaction

Percussion Vest Machine



1. Henry's Design

Henry created the above design using Google Slides.



2. 3D Printed Design

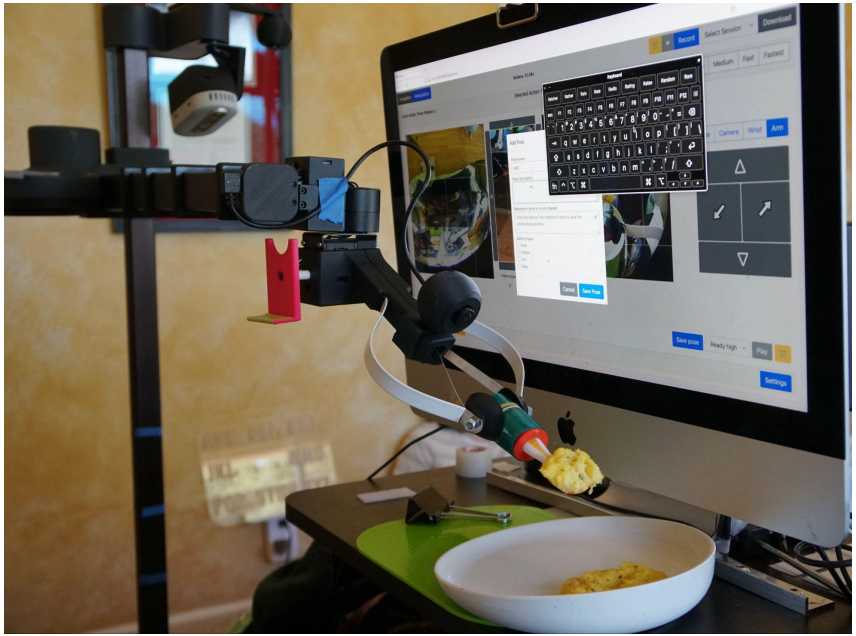
Anna Garverick used computer-aided design (CAD) to create a 3D printed version of Henry's design.

3. 3D Printed Button Pusher

Above is the final product! The tip is highlighted with green tape with two bumpers on the tool's side to prevent it from sliding in the gripper.

Tools Built for User-Specific Needs

Self-feeding in Bed



Self-feeding set-up

Self-feeding video

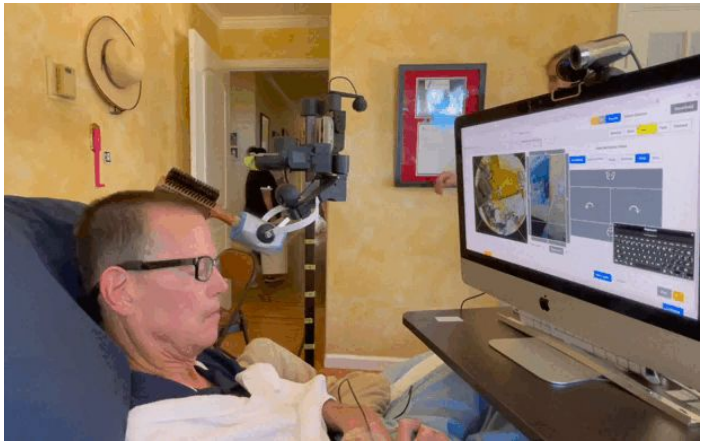
Self-feeding in a Wheelchair

Self-feeding spoon

Taping the floor to reference the optimal position

Henry self-feeding & wiping

Scratching Itches



Henry scratches his head
(real-time teleoperation)

Turning on/off a Lightswitch

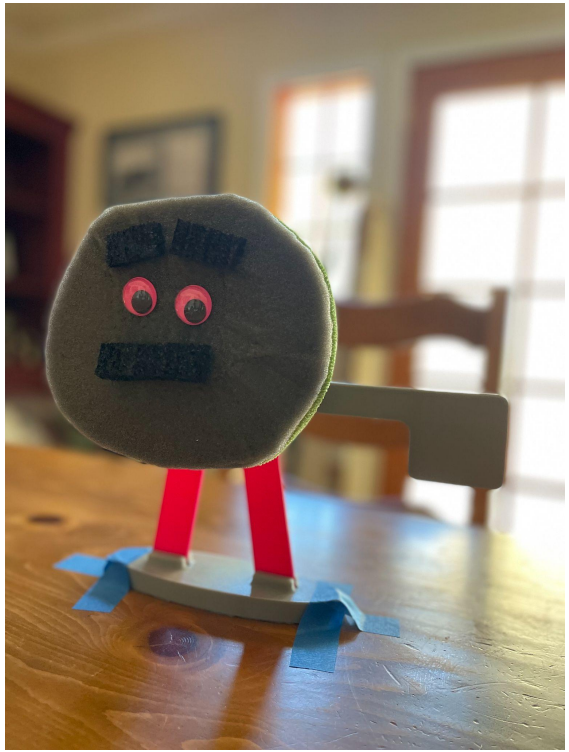
Turning on/off a Lightswitch

Turning on/off a Lightswitch

Video demo
(real-time teleoperation)

Playing Card Games

Card Holder



Towing a Laundry Basket

Tow hitch mechanism

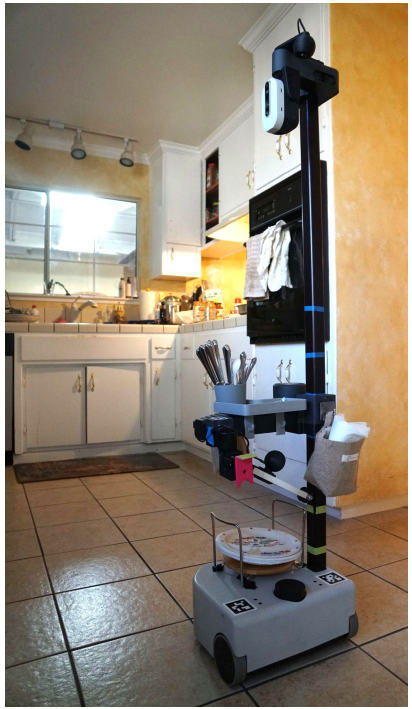
Towing in action (real-time teleoperation)

Towing a Laundry Basket

Henry driving Stretch down a hallway & stairs (real-time)

Henry releasing the laundry hamper in the laundry room (real-time)

Meal Preparation



Meal/storage accessories for Stretch

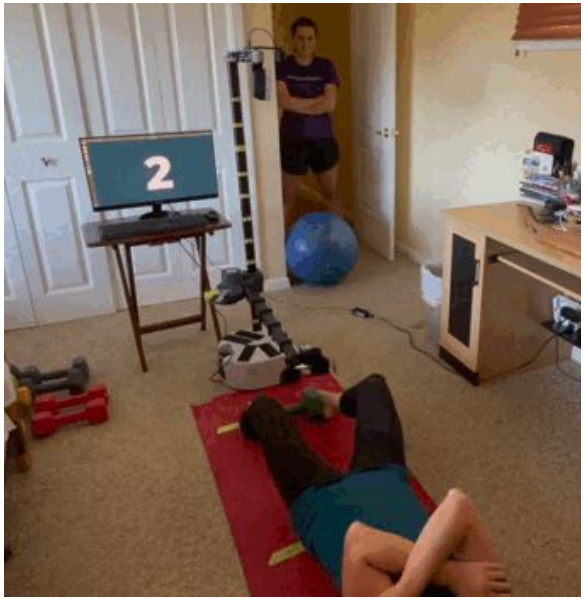
Stretch being one with the meal prep process

Meal Delivery

Meal prep & delivery

Meal Clean-up

Stretchercise



Home Page

Evolving Ways of Doing

Access to Care

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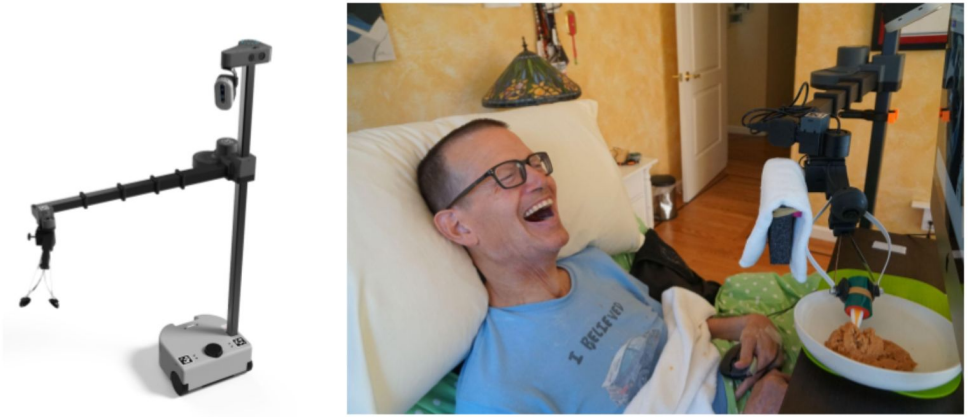
Access to Care

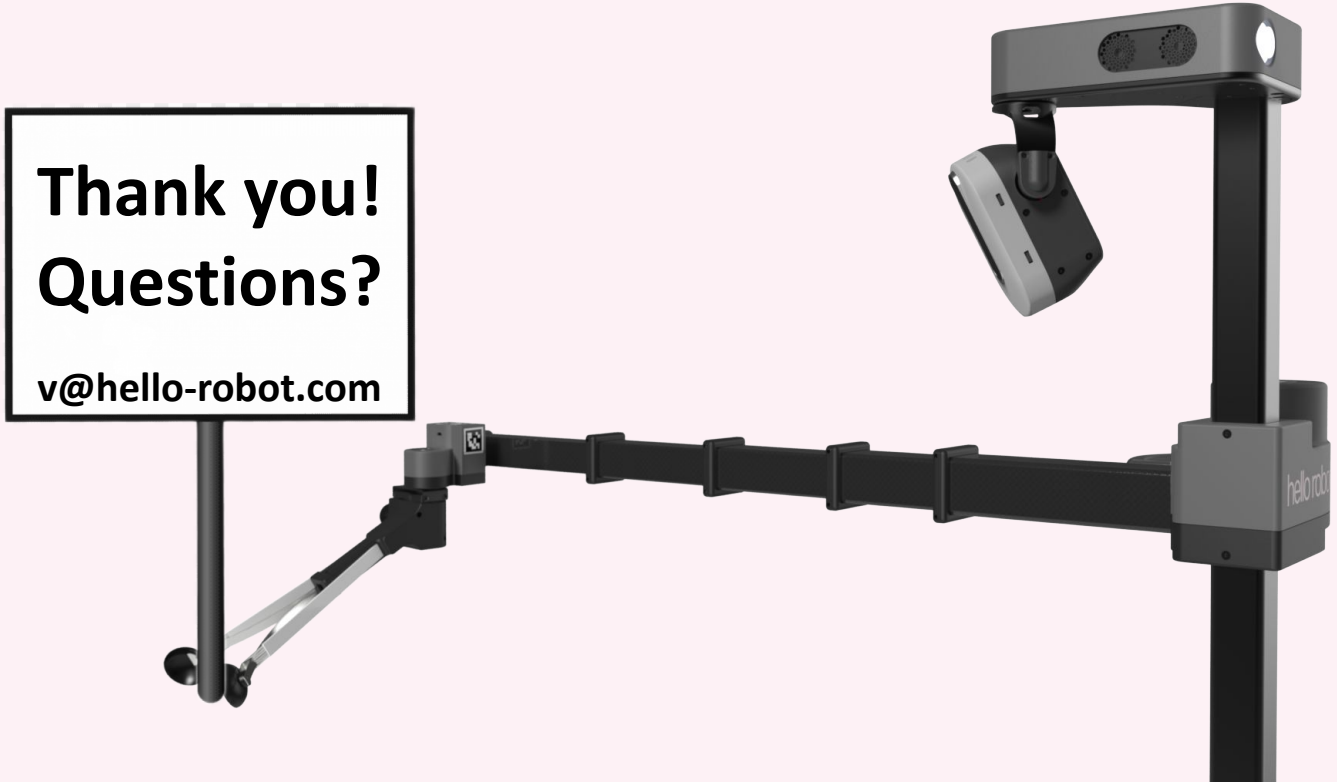


Hello Robot's Stretch earned a $2.5 million grant to expand the robot's capabilities. | Source: Hello Robot

The National Institute on Aging, part of the National Institute of Health (NIH), awarded **Hello Robot** with a Phase II Small Business Innovation Research grant worth approximately $2.5 million.

Hello Robot creates assistive mobile manipulator robots that aim to help aging adults with cognitive and physical impairments. With the grant, the company hopes to further develop its Stretch Cognitive and Physical Assistant.

Emerging Collaboration


Thank you!
Questions?
v@hello-robot.com