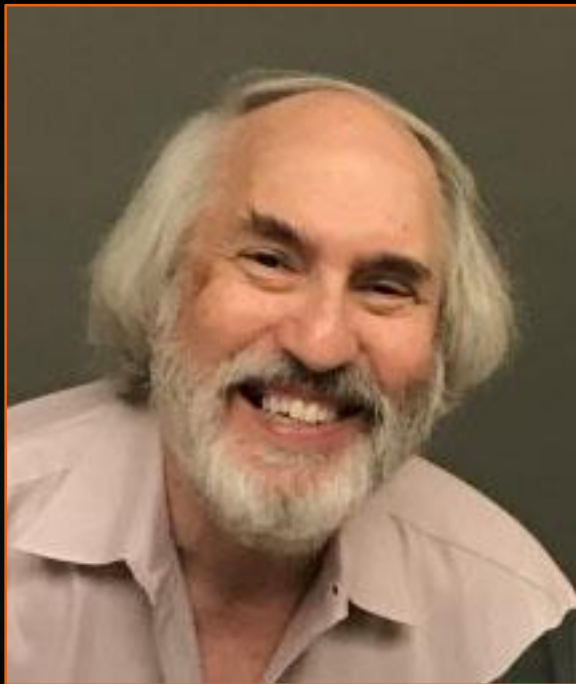


January 6, 2022  
Team Project Pitch Day



# ENGR110/210

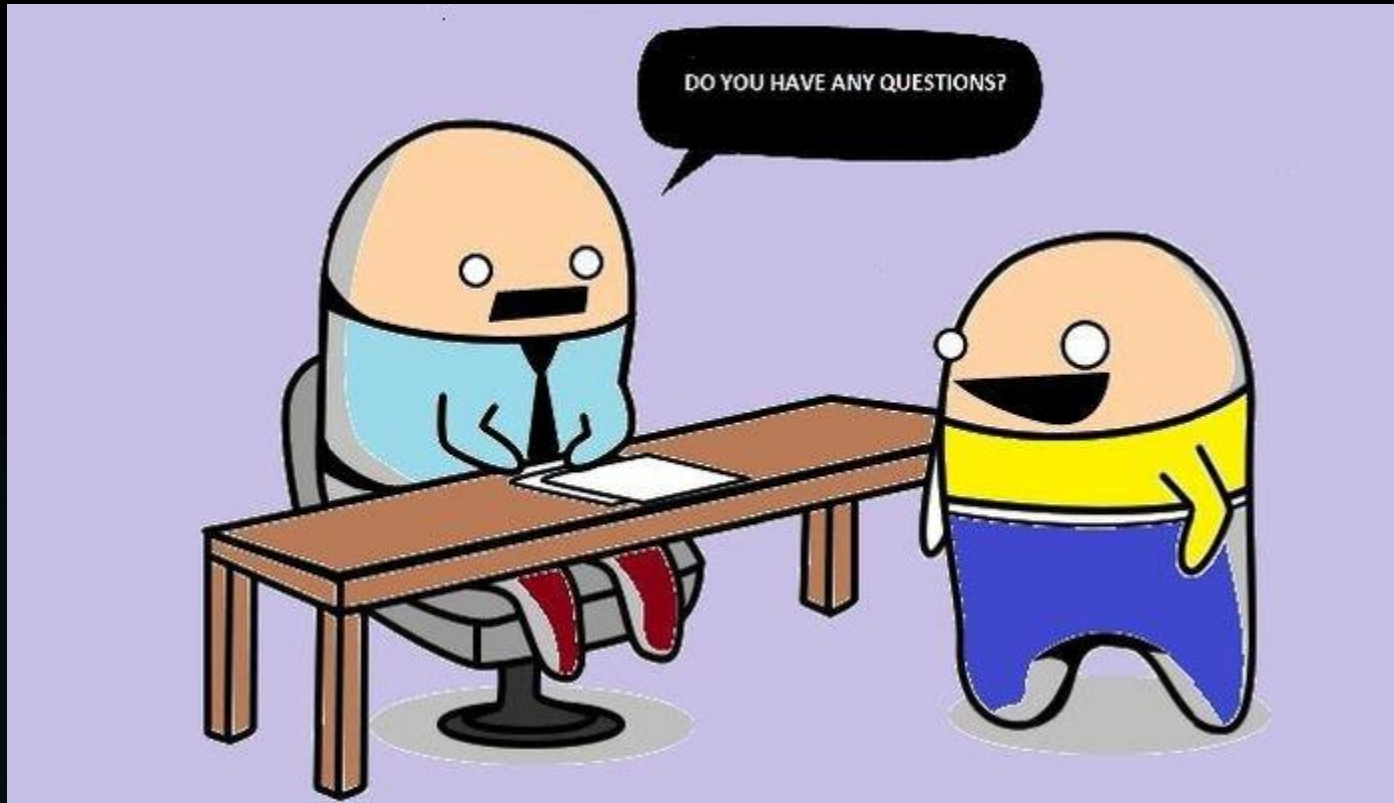
## Perspectives in Assistive Technology



David L. Jaffe, MS  
Instructor

16  
Years

# Do You Have Any Questions?



# Thanks to:

- ▶ Students:
  - ▶ Enrolling and participating in the course
  - ▶ Filling out lecture evaluations and comments
- ▶ Haas Center for Public Service:
  - ▶ Funding
- ▶ Community Members:
  - ▶ Participating and “adding to the conversation”
- ▶ Project Suggestors:
  - ▶ Suggesting great projects
  - ▶ Working with students



# Suggestor



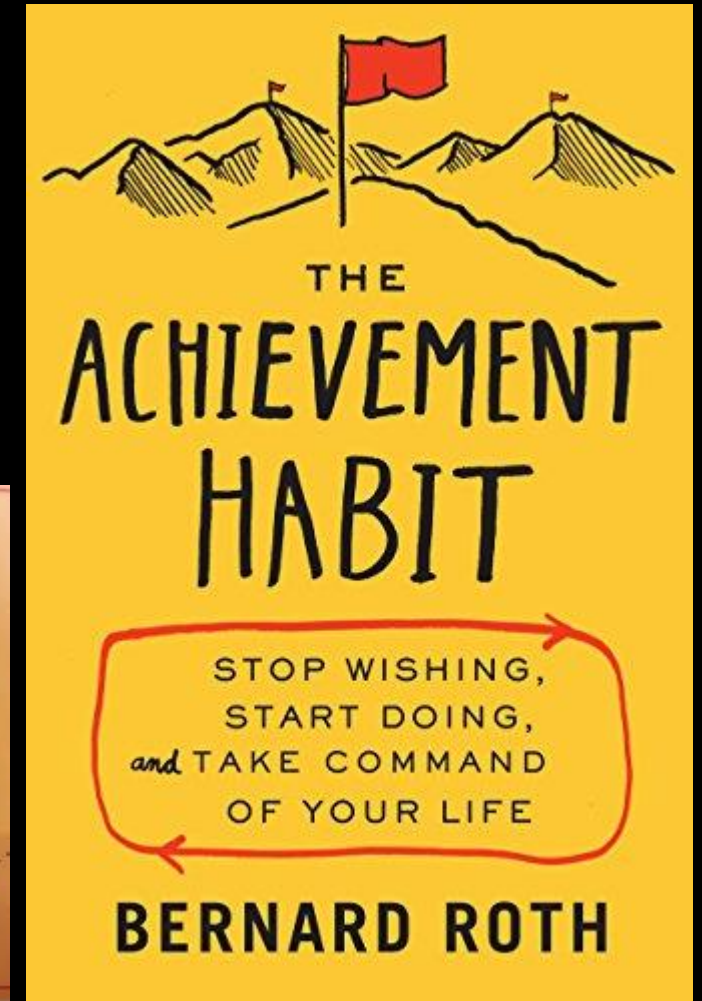
actor, adjudicator, adjustor, advisor, alienator, animator, aviator, capacitor, competitor, consolidator, creator, defector, dictator, director, discriminator, doctor, eliminator, estimator, evaluator, fabricator, facilitator, innovator, instructor, interrogator, investigator, liberator, navigator, orator, perpetrator, predecessor, predictor, procrastinator, proctor, professor, renovator, resistor, sponsor, **suggestor**, suitor, supervisor, tailor, traitor, visitor



# Missing a required class session



1. Let me know (beforehand, if possible) by email
2. Do not provide a reason
3. Make up the missed class session promptly



# Enrolled Student Attendance List



- ▶ All enrolled and auditing students: Please fill out Google Attendance Form in every class session to verify your presence.

 Form url will be posted in Chat.

# Candidate Team Projects



- ▶ For students taking the course for **three credits**



Follow along on the class session webpage



After all pitches, use the Google Form to indicate your top 5 project choices.



I will compile all project choices on the course website to facilitate project selection and team formation

# Tuesday, January 11th



Creating Assistive Technologies -  
Understanding the Problem

Gayle Curtis - UX Design Consultant



# Leftovers from Tuesday



- ▶ Persistent vegetative state - loss of higher brain functions



Terry Schiavo

- ▶ 2. Moses' disability: In a test of baby Moses' capability to destroy the kingdom of Pharaoh, angel Gabriel guided Moses' hand to pick up live coal, which he took up and put in his mouth. This burned his tongue, causing him difficulty in speaking, but saved his life.



# Leftovers from Tuesday

- ▶ “Assistive Tech”
- ▶ “Wheelchair Bound”
- ▶ “Disabling Situation”



# Today's Agenda



1. Introduction of Course Resource People
2. Overview of PRL and Room 36 Resources
3. Considerations for Project Selection
4. Brief break
5. Project Pitches
6. Open Zoom Question Time

# Course Resource People



- ▶ Matteo Zallio, PhD
- ▶ Deborah E. Kenney, MS, OTR/L



- ▶ Douglas F. Schwandt, MS
- ▶ Jules Sherman







Rachel Wallstrom

PRL Course Assistant &  
Former ENGR110 Student





# Five Minute Overview of PRL & Room 36 Resources



The Stanford **Product Realization Lab** (PRL) is a multi-site teaching facility where Stanford students discover the power to create the future. Established as the Student Shops when the university opened its doors, the PRL has been at the heart of Stanford's pragmatic, results-driven curriculum for more than 125 years. Each year, under the mentorship of PRL faculty and course assistants, more than 1000 Stanford undergraduate, graduate, and professional school students make things of lasting value - innovative medical, food production, transportation, communications, and consumer products - that transform lives at home and abroad.

Stanford Product Realization Lab **Course Assistants** are chosen through a highly competitive selection process. They come from a broad array of academic fields and professional experience. All are committed to helping Product Realization Lab students achieve successful product realization through successive prototyping and rigorous experimentation with processes and materials.



## STANFORD PRODUCT **REALIZATION** LAB

- ▶ Design and Manufacturing
- ▶ Open to any current Stanford student
- ▶ Any project\*, personal or class-related
- ▶ Tools and Workspace
- ▶ Training, Advice, and Inspiration from our talented and knowledgeable faculty, staff, course assistants, and user community





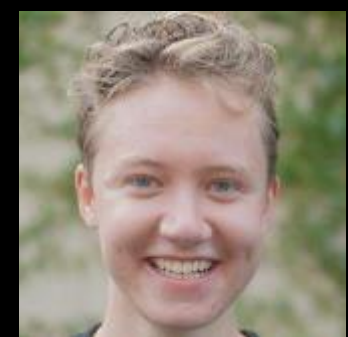
STANFORD  
PRODUCT  
**REALIZATION**  
LAB

# Leadership Team





# PRL Course Assistants



JORDAN QUAD

PARKING STRUCTURE 2  
P

VIA ORTEGA

PANAMA ST

**ROOM 36**  
IN JEN-HSUN HUANG ENGINEERING CENTER

LOMITA MALL

MAIN QUAD

LASUEN MALL

**OFFICES/ CLASSROOMS**  
IN BLDG 550

MEMORIAL CHURCH

PANAMA WY

**MAIN LAB**  
IN BLDG 610

DUENA ST

OLD UNION

STANFORD BOOKSTORE

SANTA TERESA ST

SAMUEL MORRIS WY

TRESSIDER UNION

LANE A

# STANFORD PRODUCT REALIZATION LAB

LOMITA DR

LAGUNITA DR

P

MAYFIELD AVE







# ROOM 36

# RAPID PROTOTYPING

- ▶ Make Something!
- ▶ Build, Test, and Communicate your ideas... quickly
- ▶ No experience necessary
- ▶ Think with your hands
- ▶ Have Fun!

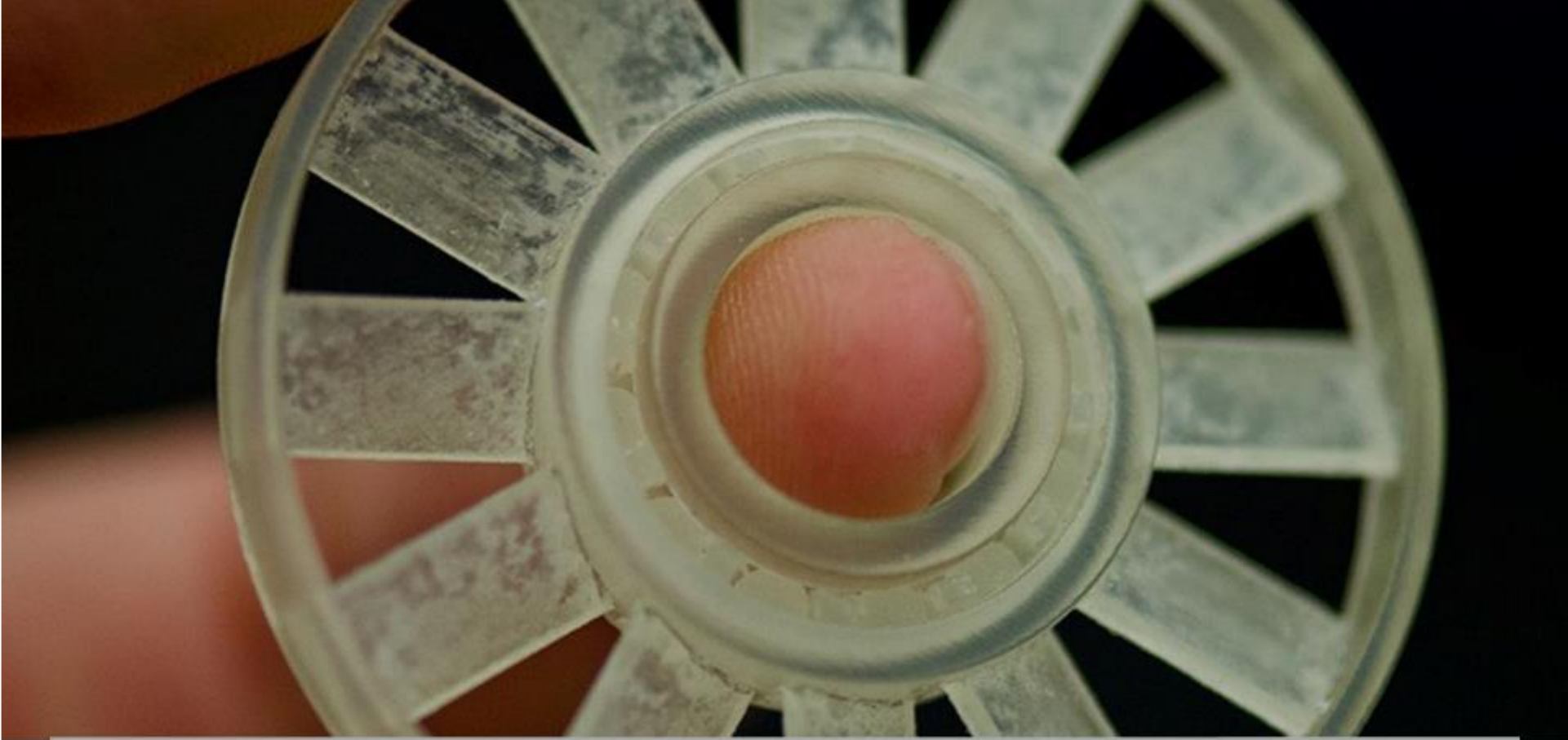




*excision dimm*

**LASER CUTTING**





# ADDITIVE MANUFACTURING



# 3D SCANNING





# VINYL CUTTING





# FOAM CUTTING



**SEWING**





# ELECTRONICS



# MATERIALS



# MAIN SHOP (BLDG 610)





MACHINGING



CASTING



WOODWORKING



WELDING







**ADVICE**

## HOW TO GET STARTED

- ▶ Visit Webshop <https://webshop.stanford.edu> Follow link
- ▶ Create a login profile with your student ID number
- ▶ Sign up for a safety orientation (roughly 75 min)
- ▶ There is no Shop Fee!
- ▶ That's it! Then come in and use the PRL!







# SEE YOU SOON!

<https://productrealization.stanford.edu>

[Follow link](#)

# Team Project Selection



For those working on a Team Project:



▶ Read team project descriptions on course website:



▶ Fill out Project Preferences Form during / after pitches:

▶ Talk to project presenters in Break Out Rooms after the pitches

Project Preferences for Students Working on a Team Project

See <http://web.stanford.edu/class/engr110/lecture01b.html> for links to project descriptions.

dljaffe@stanford.edu [Switch account](#) 🗄️ Draft saved

Your email will be recorded when you submit this form

\* Required

Name \*

Your answer

# Considerations for Team Project Selection



## Course load

- ▶ Can you spend the time working on a project? Courses like ME103, ME170, ME203, ME210, ME218, ME310, and BioE141 are very demanding.
- ▶ Are you a TA or CA?
- ▶ Do you have athletic practices?

## Fabrication skills

- ▶ Have you built anything before?

# Project Preferences



 Email Dave with selected project, team members, project name (optional) by **Tuesday, January 11<sup>th</sup>**

- ▶ Prepare to “hit the ground running” by:
  - ▶ Connecting with your Project Suggestor





# Why you may want to



If you have enrolled for **three units**, you may want to consider taking the course for **one unit** or **waiting until next year** if:

1. You are **not graduating**, or
2. If you have limited fabrication experience, or
3. If you are already taking a project course like ME112, ME170, ME203, ME210, ME218, ME310, BioE141, or ...
4. If you have to miss lectures or field trips, or
5. You are unable to devote **4 hours per week** to your project.

Take it  
twice!



# Team Project Selection

For those working on 3 credit unit Team Projects:

- ▶ Pursue project pitched by suggestor
- ▶ Meet with Dave for suggestions and approval



# Individual Project Selection

For those working on 1 credit unit Individual Projects:


- ▶ Research an assistive technology topic
- ▶ Work on a CAD design of an assistive technology device
- ▶ Fabricate a functional prototype
- ▶ Build an appearance model
- ▶ Create a work of art
- ▶ Engage in an aftermarket aesthetic design
- ▶ Engage in an aftermarket functionality / usability design
- ▶ Optionally pair with another student for Understanding the Problem and Brainstorming
- ▶ Meet with Dave for suggestions and approval



# Short Break





 Fill out Google Forms Attendance Sheet

 Hand in your Student Signup Form from Tuesday if you haven't already



Attendance Sheet - Lecture 01b


Lecture 01b - Project Pitch Day - David L. Jaffe, MS & Project Suggestors

 dljaffe@stanford.edu (not shared) [Switch account](#) 

Name

Your answer \_\_\_\_\_

2022 Enrolled Student Signup Sheet

[dljaffe@stanford.edu](#) [Switch account](#) 

Your email will be recorded when you submit this form

**\* Required**

Name \*

Your answer \_\_\_\_\_



# Projects Pitched by Suggestor



## Projects with **Abby**:

- ▶ Communication Aid for Nathan
- ▶ Alert Project
- ▶ Rain Shield Project
- ▶ Large Art Drawing Board
- ▶ Accessible Storage Solution
- ▶ Leash Project



## Projects with **Olenka** at the Magical Bridge Playground:

- ▶ Accessible & Inclusive Playground Attractions

# Team Projects Pitched by Suggestor



## Projects with Nick Z:

- ▶ Adjustable Wheel Locks
- ▶ Personal Item Organization and Storage
- ▶ Improved Wheelchair Caster Wheel Project



## Projects with Kate & McKenzie at the Cantor Arts Center:

- ▶ Exhibition Engagement Tool
- ▶ A Day at the Cantor Arts Center



## Project with Gary:

- ▶ Improved Ankle Foot Orthosis Mold

# Team Projects Pitched by Suggestor



Project with **Nick J:**

- ▶ Video Therapy Documentation



Project with **Jorge:**

- ▶ Ski Pole



Project with **Danny, Kiara, and Stanford:**

- ▶ Dog Feeding Aid
- ▶ Belt Buckle Project
- ▶ Scoot-Back Project
- ▶ Wearable Storage Pack



# Projects Suggested by Dave



- ▶ Creative Expression
- ▶ Designing Your Afterlife
- ▶ Student-defined Projects

# Projects with Abby

- ▶ “I am mobility impaired, 4'11" tall, and only able to lift 10 pounds. I am very active in advocacy and social justice issues, especially focusing on individuals with disabilities. I speak at national conventions for many organizations.”
- ▶ Challenges to address:
  - ▶ Communication Aid for Nathan
  - ▶ Alert Project for Abby
  - ▶ Rain Shield Project
  - ▶ Large Art Board Project
  - ▶ Accessible Storage Project



# Communication Aid for Nathan



- ▶ Explore designs for a device that would "speak for Nathan", informing people that he is "on the job" and not available to be petted or engage in human-canine conversation.



[Play video](#)



# Alert Project for Abby



Explore designs to alert people in Abby's path.



[Play video](#)

# Rain Shield Project



- ▶ Explore designs for a suitable covering (a garment or wheelchair / scooter accessory) to protect Abby and her mobility device.



[Play video](#)

# Large Art Drawing Board



- ▶ Explore designs for a drawing board that will support large format art media.



[Play video](#)



# Accessible Storage Solution



- ▶ Explore designs for a wheelchair accessible storage solution.



[Play video](#)

# Projects with Olenka at Magical Bridge Playground(s)



Accessible? Inclusive? ADA-Complaint?

Let's Reimagine Playgrounds to Include ALL

Beyond "Accessible," There is **Magic!**

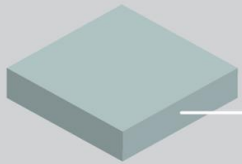
- ▶ Create new play and educational experiences for all ages and all abilities.
- ▶ Incorporate design needs of all playground users and visitors, especially those with visual impairments, sensory issues and diminished fine motor skills.



On deck: Nick Z

# The Discovery:

**ADA  
(10%)**



**Overlooked in Playground  
Design (90%)**

Autism Spectrum Disorder

Physical Impairments

Visual/Auditory Impairments

Sensory Impairments

Cognitive Disabilities

Older Adults

Medically Fragile

Wheelchair Users



**A Magical Bridge Playground Means:**

**ALL Ages**

**ALL Abilities**

**ALL Welcome!**





# TYPICAL PLAYGROUND



**Loose Surfaces**  
Not Accessible  
+ Unsafe for  
Breathing  
Impairments

**Uneven  
Platforms**

**“Rat Maze”**

**No Group Play**  
Space Limited to  
Individual Play

**Defined Paths**  
Little Play Value

**No Shade**  
No Escaping  
Frenetic Pace

**Raised Borders**  
Not Accessible

**Disorder**  
Dense and  
Overwhelming

**No Retreat  
Spaces**

**One Challenge Level**  
One Age Level

**No Gates**



# ADA “Accessibility” Just Isn’t Enough



- ▶ Not a single public playground has been designed with everyone’s unique play needs in mind.
- ▶ ADA standards do not meet the needs of many living with a disability.
- ▶ 1 in every 4 live with a visible or invisible disability, public spaces must serve all.

# Magical Bridge Playground, Palo Alto (Flagship)



“Nation’s most innovative inclusive playground.”

7 Unique Zones: Playhouse & Tree Deck, Slide Mound, Spinning Zone, Picnic & Performance Area, Swinging & Swaying Zone, Music Zone, and Tot Play Zone



Playground features are a mix of custom designed equipment and off-the-shelf technology often applied in unique ways.

Global interest brings 25,000 visitors a month here!



## **Additional Magical Bridge Custom Playgrounds Now Open:**

Addison Elementary School, Palo Alto

Red Morton, Redwood City

CuriOdyssey Zoo and Museum, San Mateo

## **Other Local Projects Underway:**

Sunnyvale

Morgan Hill

Mountain View

Santa Clara

International Sites too!



# Be Part of the Magic - Join Us in Reimagining Play!



Olenka Villarreal  
[olenka@magicalbridge.org](mailto:olenka@magicalbridge.org)

[www.magicalbridge.org](http://www.magicalbridge.org)

# Projects with Nick Z

- ▶ Adjustable Wheel Locks
- ▶ Personal Item Organization and Storage
- ▶ Improved Wheelchair Caster Wheel Project



# Adjustable Wheel Locks



- ▶ Explore wheel lock designs that would accommodate varying tire pressures.



# Personal Item Organization and Storage



- ▶ Explore designs for a way to store and organize Nick's personal items when he is on the go or at home.



# Improved Wheelchair Caster Wheel Project



- ▶ Explore non-castering omni-wheels as a caster wheel replacement.



# Projects with Kate & McKenzie



- ▶ Exhibition Engagement Tool
- ▶ A Day at the Cantor Arts Center

On deck: Gary



# Proposed Cantor Projects

ENGR 110/210: Perspectives in Assistive Technology

**Cantor**



ANDERSON  
COLLECTION  
AT STANFORD  
UNIVERSITY



# Introductions

## Museum Partners



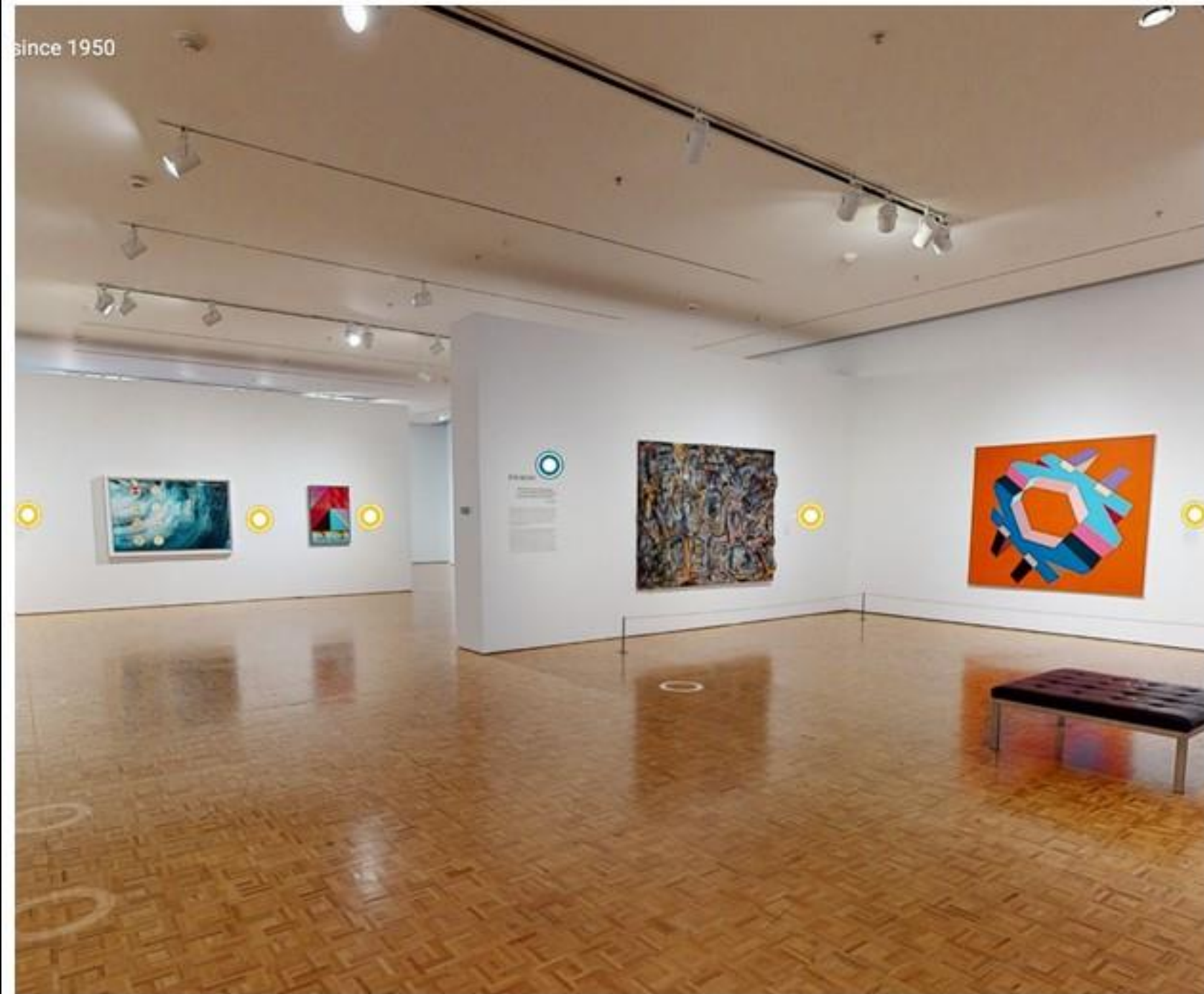
Kate Holohan (she/her)  
[kholohan@stanford.edu](mailto:kholohan@stanford.edu)  
Interim Director of Academic & Public Programs  
[Cantor Arts Center](#)



McKenzie Lynch (she/her)  
[mcklynch@stanford.edu](mailto:mcklynch@stanford.edu)  
Academic Programs Coordinator  
[Cantor Arts Center](#)











# Skills that may be useful

## Project 1: Engagement Tool

Mechanical engineering and electronics (for a mechanical device)

Programming (web and/or app)

Graphic design

## Project 2: A “Day in the Life” Film

Filmmaking & videography

Film/video editing

Interview / journalism / storytelling



# What we can provide

- General information about our galleries, building, and collections
- Museum education, programming, and curatorial expertise
- Connections with members of the blind and low vision community
- Access to museum galleries (we are open to the public Wed through Sun from 11am to 5pm, and staff can be available approximately Mon through Tue from 9am to 5pm)
- Time to meet to discuss / give feedback on ideas and prototypes; please reach out about meeting as far in advance as possible

# Q & A

Ask us anything (at the end of class)!



# Project with Gary



- ▶ Improved Ankle Foot Orthosis Mold - Explore designs for a tri-planer lower limb alignment AFO capture system that can accurately capture the standing alignment from a sitting position mold for proper AFO casting and function.







AFO casting system for  
improved alignment.

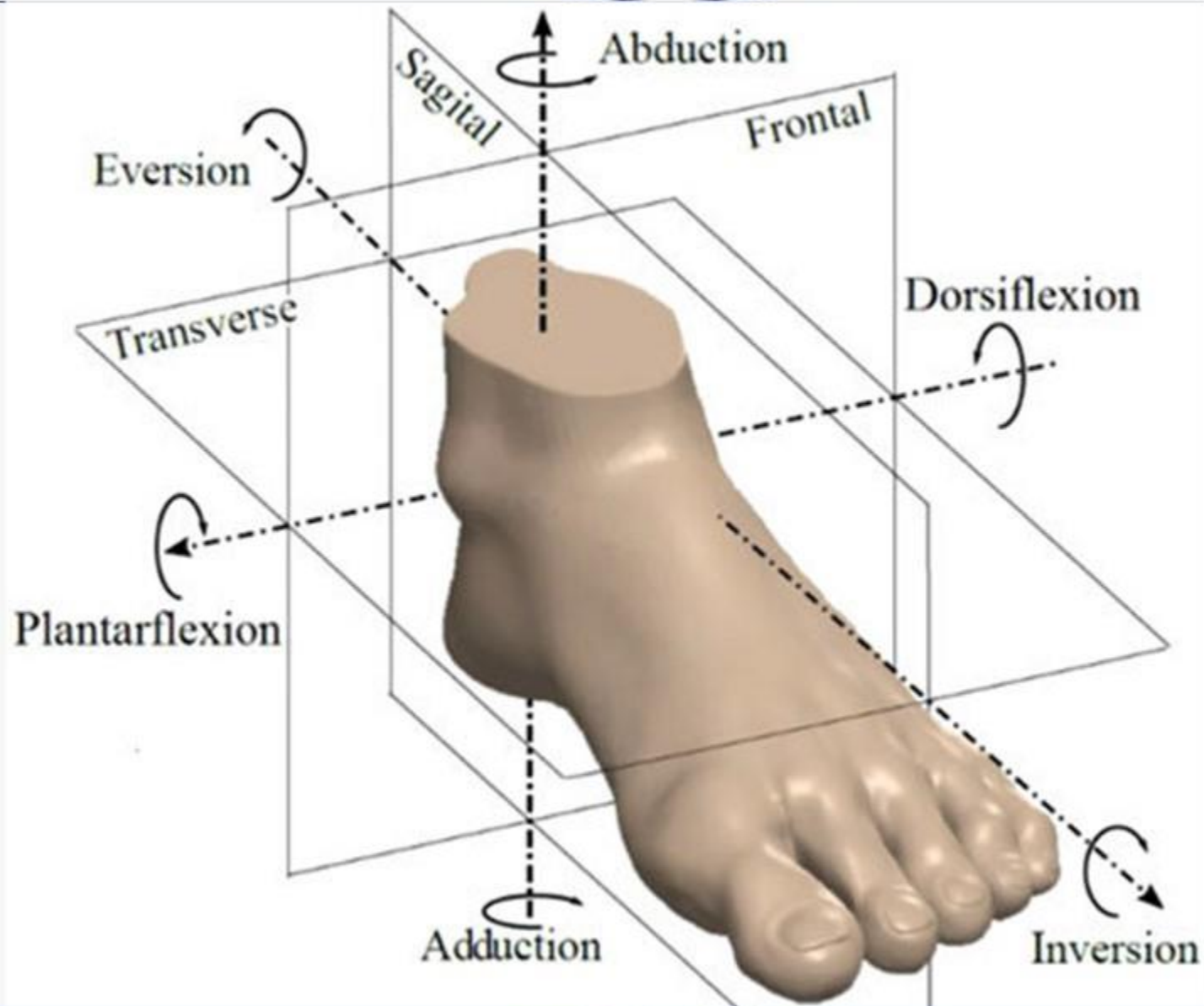
# AFO?

- ANKLE FOOT ORTHOSIS (BRACE)
  - Often used for in cases of weakness, injury, mal-alignment or pain management
  - Designed to stabilize, re-align the ankle and foot for improved comfort and function.

## AFO

- While there are some types you can buy off the shelf , we deal with the complex cases that require a custom-made device.







## How is an AFO custom made?

- An AFO is made from a mold of the patient's limb while sitting
- However ... since the foot and ankle position changes from standing / walking to sitting we need a method to capture and replicate the standing position for casting.



We need to “capture” the foot and ankle position, in all three planes of motion, at midstance (standing) and be able to replicate that alignment in a seated position while casting.

# Project with Nick J

- ▶ Video Therapy Documentation - Document Nick's self-therapy exercise efforts with the goal of helping other stroke survivors.



On deck: Jorge



[Play video](#)

# Project with Jorge

- ▶ Ski Pole - Explore designs for a new or modified ski pole that would enable Jorge to better participate in skiing.





# Projects with Danny, Kiara & Stanford



- ▶ Dog Feeding Aid
- ▶ Belt Buckle Project
- ▶ Scoot-Back Project
- ▶ Wearable Storage Pack



On deck: Dave



# Dog Feeding Aid



- ▶ Explore designs that would enable Danny to independently feed his service dog, Korey.



# Belt Buckle Project



- ▶ Explore design solutions that would make it easier for Danny to buckle himself into his wheelchairs independently.



# Scoot-Back Project



Explore design solutions that

1. would identify the slouched condition and
2. would enable Danny to independently restore himself to an upright seated position.

# Wearable Storage Pack for Danny



- ▶ Explore designs for a wearable storage pack that would enable Danny to independently and safely store his phone, wheelchair gloves, and other miscellaneous objects.



Smile and the World Will Smile Back

# Dave's Suggested Projects



- ▶ Designing Your Afterlife
- ▶ Creative Expression
- ▶ Student-Defined Team Projects



# Designing Your Afterlife



- ▶ **Designing Your Afterlife** - Dave

- ▶ Explore ways to preserve one's essence after death. In the technology extreme, this might manifest itself as an interactive system that responds to queries, retells stories, relates experiences, shares expertise, and expresses humor. The pre-dead user would be able to create and program his / her eternal computer-based persona before her / his demise.



# Creative Expression



- ▶ Creative Expression - Dave
- ▶ Explore ways to enhance creative expression for people with disabilities. This could include the creation of new activities or fabrication of new tools.



# Creative Expression using an Instrumented Wheelchair

- ▶ Explore ways to enhance creative expression for people with disabilities, especially those who use wheelchairs. This could include the creation of new activities or fabrication of new tools.





# Student-defined Team Projects



- ▶ **Student-defined Projects** - Dave
- ▶ Interview, observe, and discuss assistive technology problems with an individual with a disability or older adult. Address their desire to participate in one of the following activities by designing an adaptation to an existing device / tool or creating a new, more useful one:
  - ▶ Activities of daily living
  - ▶ Sports and exercise
  - ▶ Leisure activities and hobbies



# Open Question Time and Non-Random Access



Who is working on projects?

Get more info from project suggestor

Identify others interested in same projects



Leave this Zoom and connect with Suggestors' Zoom to get more information on projects, return here when done

What are your project preferences?

Rank your top choices

Hand in your Project Preference Sheet!

Have course questions?  
Ask Dave

See Dave if you want to work on a project that he suggested