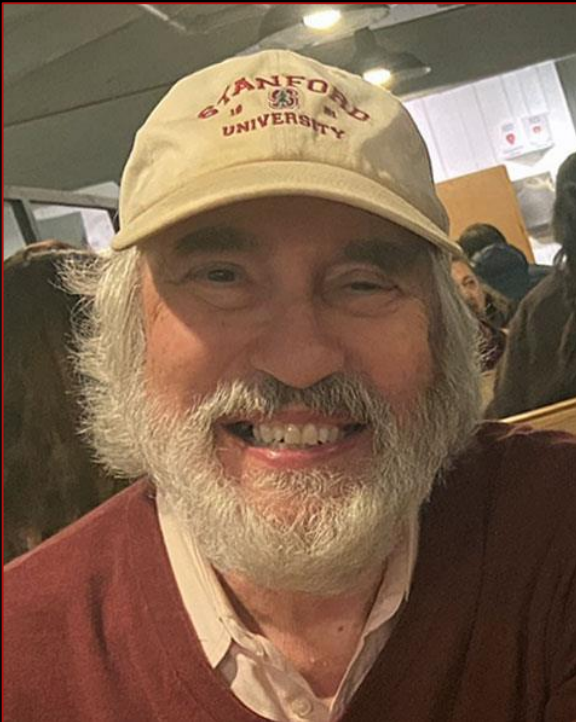


January 9, 2025
Team Project Pitch Day



ENGR110/210

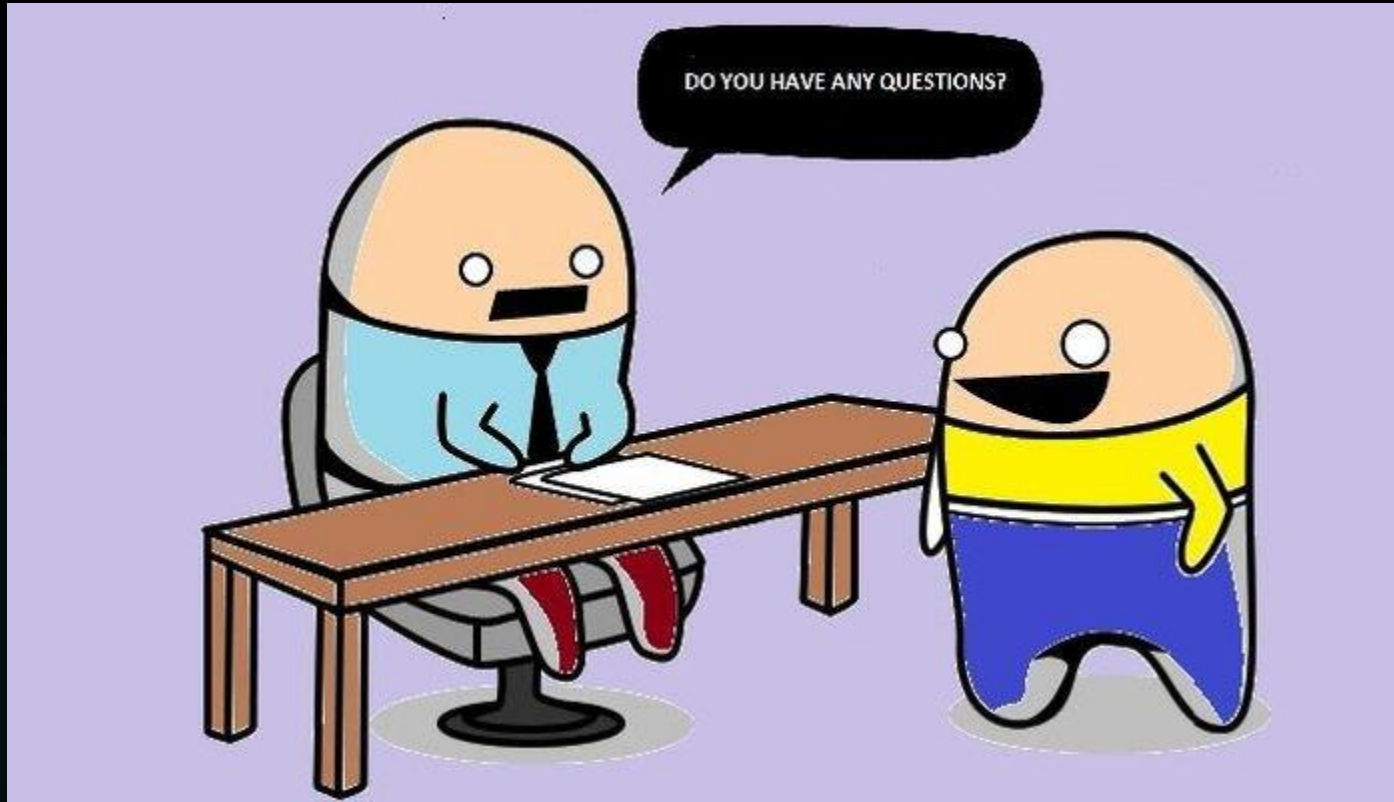
Perspectives in Assistive Technology



David L. Jaffe, MS
Instructor

19
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

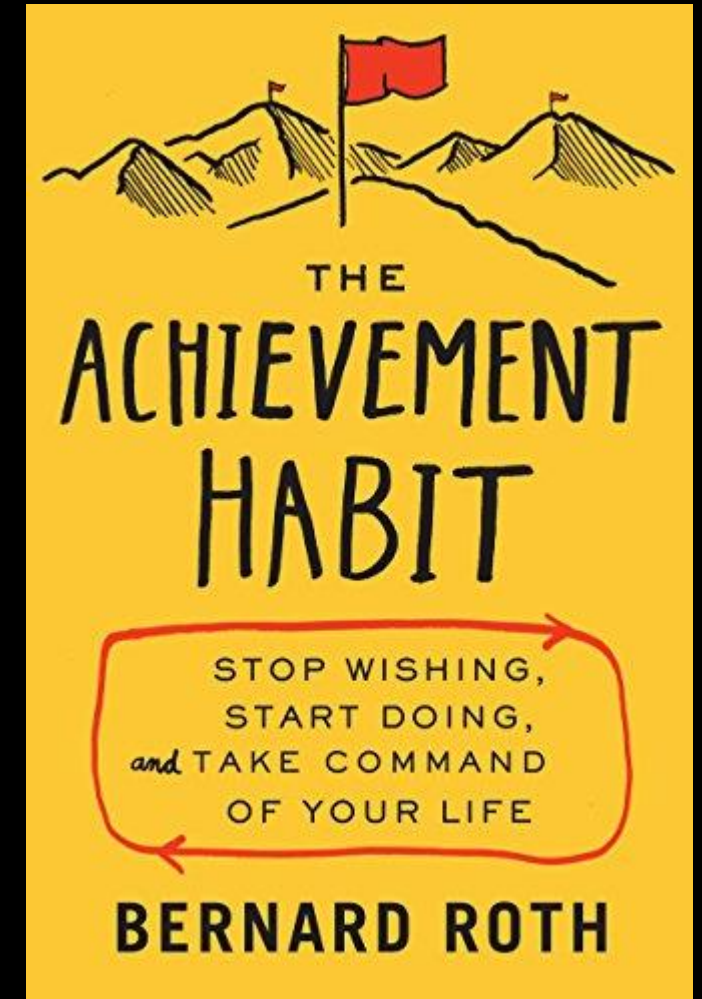


actor, adjudicator, adjustor, advisor, alienator,
animator, aviator, capacitor, competitor,
consolidator, creator, defector, dictator, director,
discriminator, doctor, eliminator, estimator,
evaluator, fabricator, facilitator, innovator,
instructor, interrogator, investigator, liberator,
navigator, orator, 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. I will provide makeup instructions
4. Make up the missed class session promptly



Enrolled Student Attendance Sheet



All enrolled and auditing students: Please fill out pink Attendance Sheet in **every class session** to verify your presence.

- ▶ No need to include “stanford.edu”

01a ENGR110/210 Enrolled Student Attendance List
January 10, 2023

Students listed in italics are enrolled for 1 credit unit

Email address @stanford.edu	Name of Enrolled Student	Email address @stanford.edu	Name of Enrolled Student
	Adebayo, Sola		Miller, Barrett Andrew
	Aydin, Baste		Mossmar, Nicole Elise
	Barnard, Nathaniel Alan		Murphy, Matt
	Black, Lucy Victoria		Namba, Ayumi
	Cazares, Jesse Anthony		Ogferman, S G
	Chang, Athena		Palmer, Jasmin Elena
	Chang, Chih-Ling		Quiroz, Jessica Citelli
	Consul, Saksham		Ramos Escoto, Omar Enrique
	Contreras-Forrest, Ezekiel Earl		Redic, Darren Troy
	Diaz, Carlos		Rieken, Merissa Bryn
	Flecher, Rodolfo Henrique		Robinson, Cameron Jared
	Francis, Cherie Chelsea Alanna		Schroeder, Olivia Cayan
	Gabriel, Ari		Seybold, Maddy Marguerite
	Garza, Aaron		Singh, Riddhi Kapoor
	Gil-Silva, Josue		Somaratne, Griffin Daniel
	Hana, Kimberly Ann		Sosa, Sophia
	Hagins, Ellen		Tana-Mesa, Stephanie
	Hau, Evan N		Thienngammy, Shaleen R
	Huang, Catherine		Toyozaki, Dominique
	Huang, Ethan		Tran, Ayumi
	Jia, Rebecca Ran		Varuvel Derrinson, Deepak
	Johnston, Corazon A.		Vinuet Quintana, Olivia Felice
	Joishi, Pranil Satish		Wang, Yu Han Dalay
	Kalandarova, Koli		Williams, Samantha Magdalena
	Karita, Uwizerwa Sonia		Wong, Emily
	Kern, Kelly Mackenzie		Zhang, Grace
	Kohye, Mehro		Zhao, Luke Yuchen
	Kwon, Andres		
	Lascar, Sasha Roland Abraham		Students on Wait List
	Li, Kaia		Linhares-Huang, Cameron Ines Ohara
	Lim, Ian		O'Malley, Seamus Patrick
	Liu, Angela J		Sandoval, Breanna
	Liu, Janet		Alex, Sommer
	Lopez, Fatima Guadalupe		
	Maeda, Henmi		
	Mathews, Quinn Jack		

If your name doesn't appear on this page, enter it on the following sheet

Leftovers from Tuesday

- ▶ Persistent vegetative state - loss of higher brain functions, now called **unresponsive wakefulness syndrome**
- ▶ Everybody has something beneficial to contribute
- ▶ A disease is a health condition that could limit an individual's ability to engage in activities of daily living. It could be a temporary situation.



Terry Schiavo



Leftovers from Tuesday

- ▶ Assistive Technology = AT
- ▶ “~~Assistive Tech~~”
- ▶ “Wheelchair Bound”



Tuesday, January 14th



Creating Assistive Technologies -
Understanding the Problem

Gayle Curtis - UX Design Consultant

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 time with Project Suggestors

Course Resource People



- ▶ Deborah E. Kenney, MS, OTR/L
- ▶ Douglas F. Schwandt, MS





Olivia Schroeder

PRL Course Assistant &
Former ENGR210 Student



PRL Overview

- ❖ Design and Manufacturing
- ❖ Open to any current Stanford student (**no fee!**)
- ❖ 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

* Excluding for-profit projects and weapons or other safety risking projects



STANFORD PRODUCT
REALIZATION LAB

PRL Leadership Team



Craig Milroy

Director, Senior Lecturer



Marlo Kohn

Associate Director, Senior
Lecturer



Dan Somen

Technical Director, Lecturer



Anna Boslough

Lecturer



STANFORD PRODUCT
REALIZATION LAB

2025 PRL Course Assistants





STANFORD PRODUCT
REALIZATION LAB

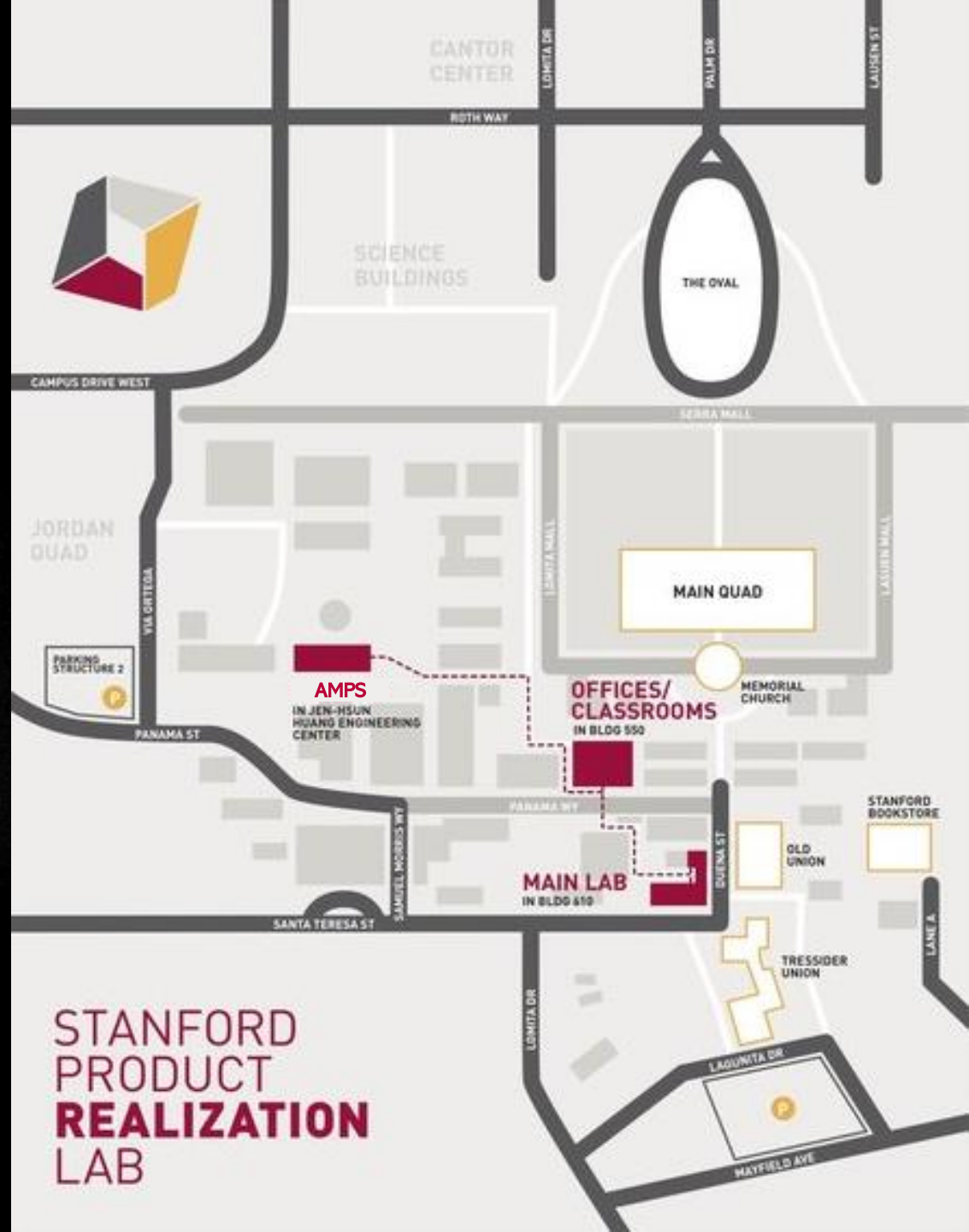
How to Get There

Main Lab

Building 610

AMPS

Basement of Huang





Resources: AMPS



Rapid
Prototyping



Laser Cutting



3D Printing



Sewing



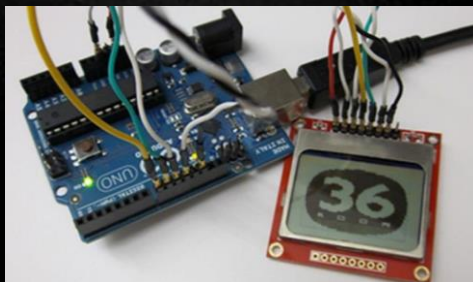
3D Scanning



Vinyl Cutting



Foam Cutting



Electronics



Photo Booth



Materials*



Resources: BLDG 610



Machining



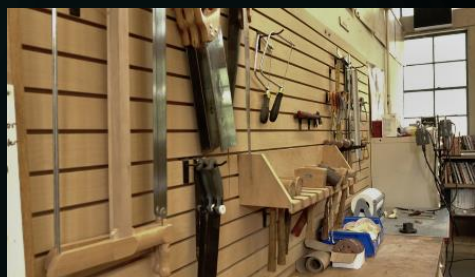
Casting



Welding



Sheet Metal
Forming



Woodworking



Silicone Molding



Injection Molding



Materials*



The Most Important Resource ... COMMUNITY!

- ❖ Come meet other makers
- ❖ Get advice / support from CAs and fellow students
- ❖ Make friends!
- ❖ Learn together



How to Get Started

- ❖ Visit Webshop <https://webshop.stanford.edu>
- ❖ Create a login profile with your student ID number
- ❖ Take the online safety quiz (roughly 10 mins)
- ❖ Sign up for and complete in-person safety training (roughly 45 mins)
- ❖ That's it! Then come in and use the PRL!



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REALIZATION LAB

SEE YOU
SOON!

<https://productrealization.stanford.edu>

Candidate Team Projects

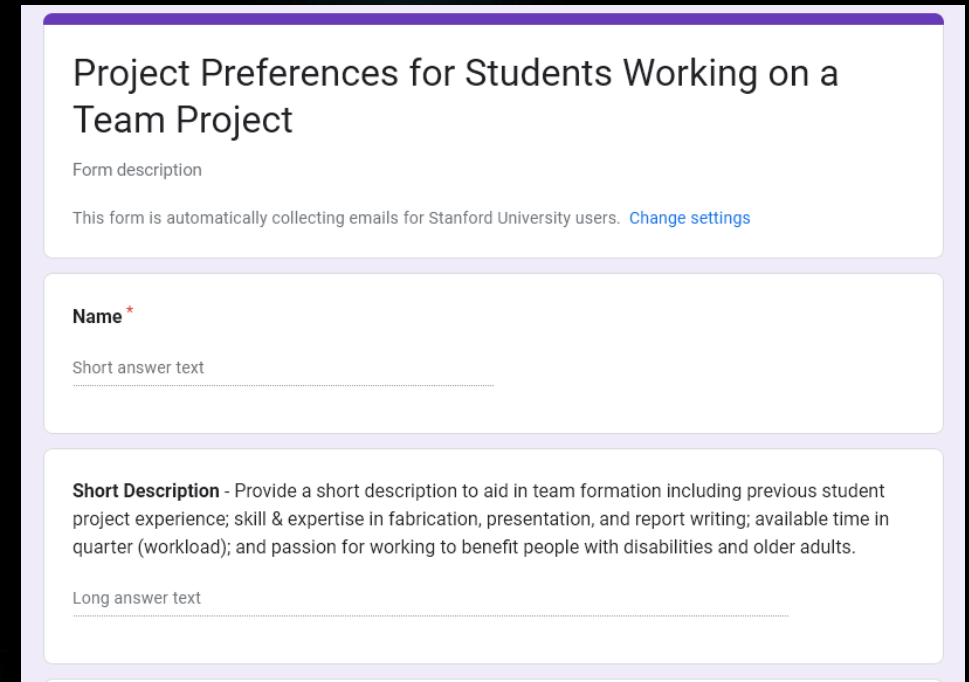


- ▶ For students taking the course for **three credits**: Use Google Form at <http://engr110.stanford.edu/01b>
- ▶ As each project is pitched, review its project description on the course website
- ▶ Take notes to help you determine your interest priority.
- ▶ At the end of all presentations, review your notes and select your **top five** project preferences.
- ▶ Speak to the Project Suggestors after the pitches for more information.
- ▶ **Don't forget to submit the form today.**
- ▶ I will compile all project choices on the course website to facilitate project selection and team formation (3 or 4 students per team)

Team Project Selection

For those working on a Team Project:

- ▶ Bring up Google Form:
<http://engr110.stanford.edu/01b>
- ▶ Read team project descriptions on course website
<http://web.stanford.edu/class/engr110/team-projects.html>
- ▶ Fill out Project Preferences Form during pitches
- ▶ Talk to Project Suggestors after the pitches



Project Preferences for Students Working on a Team Project

Form description

This form is automatically collecting emails for Stanford University users. [Change settings](#)


Name *

Short answer text

Short Description - Provide a short description to aid in team formation including previous student project experience; skill & expertise in fabrication, presentation, and report writing; available time in quarter (workload); and passion for working to benefit people with disabilities and older adults.

Long answer text



<p><u>Kitzmann, Mathilda</u></p>  <p>Senior ME & Psychology</p>	<p>Short Description:</p> <p>I am a senior in MechE on the product realization track. Through that I got some experience in manufacturing methods. In my capstone project we are working on the manufacturing process of a wheelchair.</p>
--	---

- [illegible]

Considerations for Team Project Selection



Course load

- ▶ Students average 5 hours/week on their project in this course.
- ▶ 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?
- ▶ **Would you be a good team member?**

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 5 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
- ▶ Weekly Progress Reports - alternate between:
 - ▶ In-person meetings (with Dave, Lance, or Mathilda)
 - ▶ Emailed progress report
- ▶ Photo documentation of project
 - ▶ Photos of individual students or entire student team for Report & Presentation Cover Page
 - ▶ Photos of team working with user and fabricating prototypes
 - ▶ Photos of final prototype stand-alone and with user and with user & team



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



Project Preferences



- ▶ Email Dave with selected project, team members, project name (optional) by **Tuesday, January 14th**
- ▶ First to email gets the project
- ▶ Prepare to “hit the ground running” by:
 - ▶ **Meeting with your teammates**
 - ▶ Connecting with your Project Suggestor
 - ▶ Connecting with Dave, Lance, or Mathilda



Short Break

- Fill out Class Session Attendance Sheet

01a ENGR110/210 Enrolled Student Attendance List
January 10, 2023

Students listed in italics are enrolled for 1 credit unit

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	Adebayo, Sola
	Aydin, Beste
	Barnard, Nathaniel Alan
	Black, Lucy Victoria
	Cazares, Isaac Anthony
	Chang, Athena
	Chang, Chih-Ling
	Conaul, Saksham
	Contreras-Forrest, Ezekiel Earl
	Diaz, Carlos
	Fischer, Rodolfo Henrique
	Francis, Cherie Chelsea Alanna
	Gabriel, Ari
	Garza, Aaron
	Gil-Silva, Josue
	Heng, Kimberly Ann
	Higgins, Elijah
	Hsu, Evan N
	Huang, Catherine
	Huang, Ethan
	Jia, Rebecca Ran
	Johnston, Corazon A.
	Joshi, Pranil Satish
	Kalenderova, Kohl
	Karita, Uwizerwa Sonia
	Kern, Kelly Mackenzie
	Kohga, Mahe
	Kwon, Andrea
	Lascar, Sasha Roland Abraham
	Li, Kala
	Lim, Ian
	Liu, Angela J
	Liu, Janet
	Lopez, Felima Guadalupe
	Maeda, Harumi
	Mathews, Quinn Jack

Email address @stanford.edu	Name of Enrolled Student
	Miller, Barrett Andrew
	Mosser, Nicole Elise
	Murphy, Matt
	Namba, Ayumi
	Opferman, S G
	Palmer, Jasmin Elena
	Quiroz, Jessica Citielli
	Ramos Escoto, Omar Enrique
	Redie, Darren Troy
	Rieken, Merissa Bryn
	Robinson, Kameron Jarod
	Schroeder, Olivia Cyan
	Seybold, Maddy Marguerite
	Singh, Riddhi Kapoor
	Somaratne, Griffin Daniel
	Sosa, Sophia
	Tena-Meza, Stephanie
	Thienmany, Shaleen R
	Toyozaki, Dominique
	Tran, Ayumi
	Varuvel Dennison, Deepak
	Viruet Quintero, Olivia Felice
	Wang, Yu Han Daley
	Williams, Samantha Magdalena
	Wong, Emily
	Zhang, Grace
	Zhao, Luke Yuchen
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	Linhars-Huang, Cameron Ines Ohara
	O'Malley, Seamus Patrick
	Sandoval, Breanna
	Alex, Sommer

If your name doesn't appear on this page, enter it on the following sheet



Online Project Preferences Google Form



<http://engr110.stanford.edu/01b>

Project Preferences for Students Working on a Team Project

Form description

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Name *

Short answer text

Short Description - Provide a short description to aid in team formation including previous student project experience; skill & expertise in fabrication, presentation, and report writing; available time in quarter (workload); and passion for working to benefit people with disabilities and older adults.

Long answer text

Perspectives in Assistive Technology - Winter 2023

Project Preferences for Students Working on Team Projects (3 credit units)

Student name: _____

As each project is pitched, indicate your general interest in one of the first three columns with a ✓ or ✗. At the end of the all the presentations, select your top five project preferences in the fourth column - optionally providing an ordinal (1st, 2nd, 3rd, 4th, 5th) ranking.

☹	😊	😊	Indicate Top Five	Project Name
				1. Communication Aid for Nathan - Abby
				2. Alert Project - Abby
				3. Rain Shield Project - Abby
				4. Mobile Laptop and iPad Computer Support - Abby
				5. Accessible Storage Solution - Abby
				6. Leash Project - Abby
				7. Bass Reduction Project - Cat
				8. Aesthetic Prosthetic Leg Project - Mary
				9. Projects at the Magical Bridge Playground - Olenka
				10. Water Bowl for Danny's Service Dog Korey - Danny
				11. Leash Project for Danny & Korey - Danny
				12. iPhone Project - Danny
				13. Laptray Project - Danny
				14. Designing Your Afterlife - Dave
				15. Creative Expression - Dave
				16. Student-defined team projects - See Dave for approval

Team Projects Pitched by Suggestor



▶ Projects with Abby:

- ▶ Enhanced Visibility Project for Abby's Wheelchair
- ▶ Rain Shield Project
- ▶ Universal Water Bottle and Phone Holder
- ▶ Laptop Storage
- ▶ Laptray Artwork Easel

▶ Projects with Olenka at the Magical Bridge Playground:

- ▶ Accessible & Inclusive Playground Attractions (pitched by ...)

Team Projects Pitched by Suggestor



- ▶ Project with Gary:
 - ▶ Swimming with a Prosthetic Device

- ▶ Projects with Danny, Kiara, Stanford, and Korey:
 - ▶ Poop Management for Danny's Service Dog Korey
 - ▶ Treats for Korey
 - ▶ Water Bottle Opener for Danny
 - ▶ Obstacle Detector

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:
 - ▶ Enhanced Visibility Project
 - ▶ Rain Shield Project
 - ▶ Universal Water Bottle and Phone Holder
 - ▶ Laptop Storage
 - ▶ Laptray Artwork Easel



Abby & Nathan

On deck: Olenka



[Play video](#)



Enhanced Visibility Project



- ▶ Explore ways to enhance the nighttime visibility of Abby's wheelchair.



[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](#)

Universal Water Bottle and Phone Holder



- ▶ Explore designs for a water bottle and phone holder that she can easily access.



[Play video](#)

Laptop Storage



- ▶ Explore alternative storage solutions for Abby's Mac laptop which don't rely on a backpack attached behind her wheelchair seat.



[Play video](#)

Laptray Artwork Easel



- ▶ Explore designs for a wheelchair-mounted easel.



[Play video](#)



Magical Bridge Foundation

**Playgrounds & Programs Designed for
All Ages and Abilities**

Olenka Villarreal, CEO + Founder
January 9, 2025



1in4



PEOPLE ARE LIVING
WITH A DISABILITY

1 BILLION WORLDWIDE

10% of disabilities look like this....



and 90% look like this.



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



Typical Playground

Inclusive? Accessible? No

ADA Compliant? ***YES***



Typical Playground



Loose Surfaces

Not Accessible;
Unsafe for
Breathing
Impairments

"Rat Maze" No Options

No Shade

No Group Play
Space Limited to
Individual Play

Defined Paths Little Play Value

**No Retreat
Spaces**
No Escaping
Frenetic Pace

Raised Borders and Platforms

Disorder
Dense and
Overwhelming

Unimaginativ e Equipment

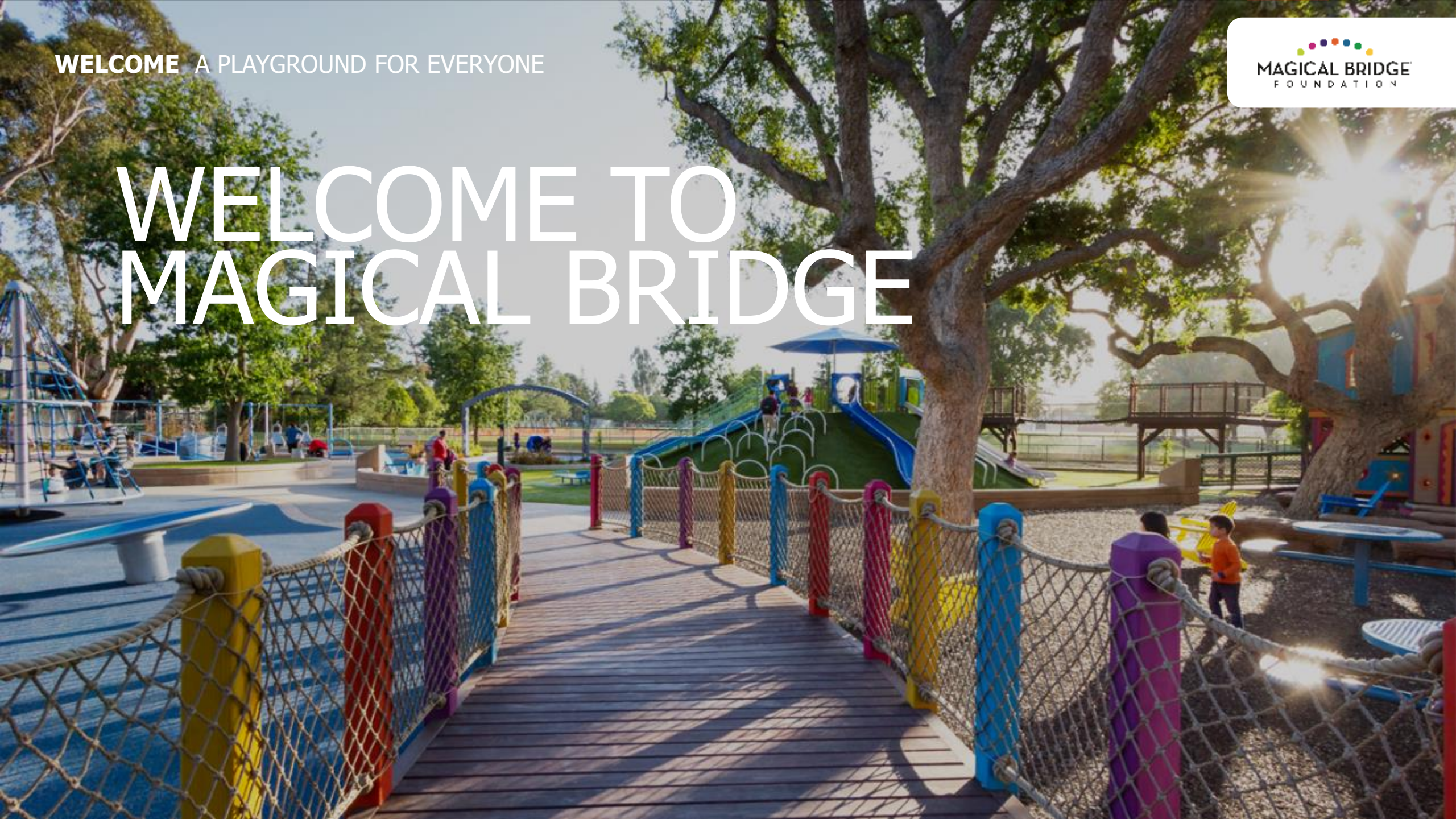
One Challenge Level
Nothing for
the Disabled

No Gates

WELCOME A PLAYGROUND FOR EVERYONE

MAGICAL BRIDGE
FOUNDATION

WELCOME TO MAGICAL BRIDGE



MAGICAL BRIDGE THE NATION'S MOST INCLUSIVE AND INNOVATIVE PLAYGROUND OPENED 2015



PLAY ZONES™ PREDICTABLE, DISTINCT PLAY EXPERIENCES, CHALLENGES, MOVEMENT, AND CHOICE



Slide Mound



Barbara Butler Original

Community Playhouse
and Stage



Spin Zone



Innovation Zone



Swing and Sway Zone



Tot Zone



Kindness Corner



Hideaway Huts

9

Magical Bridge Playgrounds Open:

Mitchell Park, Palo Alto, CA - 2015

Red Morton Park, Redwood City CA - 2020

Community Park, Morgan Hill, CA - 2022

Fair Oaks Park, Sunnyvale, CA - 2022

CuriOdyssey, San Mateo, CA - 2021

Addison Elementary, Palo Alto - 2021

El Carmelo Elementary, Palo Alto - 2023

Claudesland, Hamilton, New Zealand - 2023

Central Park, Santa Clara, CA – 2024

COMING SOON:

Rengstorff Park, Mountain View, CA – Jan 25th!

Daly City, CA

East Palo Alto, CA

Singapore Sun Park Plaza ... *and more*

Mitchell Park, Palo Alto, CA



Red Morton Park, Redwood City, CA



Fair Oaks Park, Sunnyvale, CA



Community Park, Morgan Hill, CA

FOCUS ON GROUNDBREAKING CONCEPTS AND ACCESSIBILITY



TECH



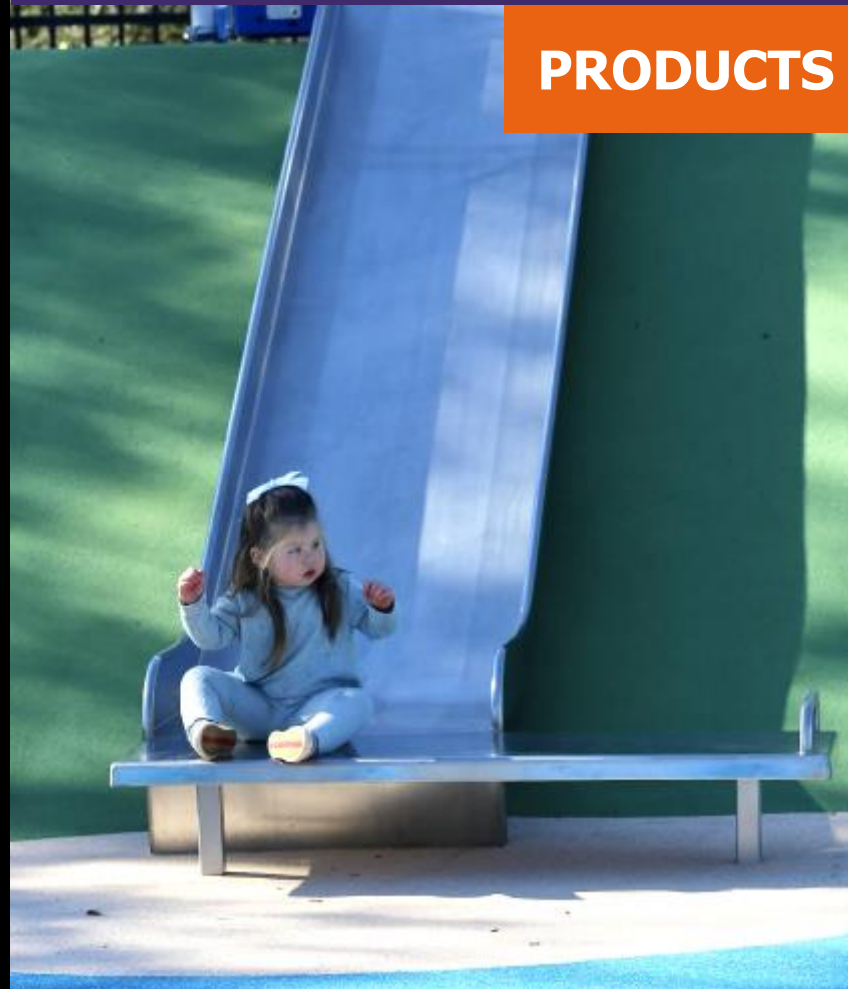
PLAY

24-String Laser Harp and Drum Pads

ACCESSIBILITY

"Slide 'N Sit" Bench for Slides

PRODUCTS



SOLUTIONS



INCLUSION

Space to Retreat from Active Play

THE OPPORTUNITY - DESIGN FOR ALL AGES AND ABILITIES



ALL ABILITIES • ALL AGES • ALL WELCOME



TECH

NEW Interactive Experiences: Music, Touch, Games

PRODUCTS

NEW Sensory Experiences for People with Autism

SOLUTIONS

NEW Engaging Fitness Equipment for Older Adults

JOIN US magicalbridge.org



JOIN OUR MAGICAL MOVEMENT

Design for all,
ALWAYS!

Thank you for
your kind attention!

.....
kindness
ambassador

Project with Gary - Beach Prosthesis



- ▶ Walking on the beach and going in the water with a Prosthetic Device
 - ▶ Prosthetic limbs are made from a variety of materials, most of which are dirt and water resistant
 - ▶ Salt water and sand present a very different set of problems



On deck: Danny, Stanford, and Kiara

Beach Prosthesis

- ▶ Salt water and metal (even stainless steel) causes corrosion and destruction if not removed immediately
- ▶ Sand gets into everything especially foot shells that cover carbon fibre feet and destroys the carbon fibre and the covering
- ▶ Sand and water also get between the limb and the prosthesis causing loss of suspension, skin irritation and injury



Beach Prosthesis

- ▶ Current solutions are inadequate
- ▶ They slide down and don't seal well
- ▶ Do not allow the foot and knee to function adequately
- ▶ They are unattractive
- ▶ They are not durable
- ▶ They float in the water making swimming difficult



Beach Prosthesis



- ▶ Looking at a below the knee prosthesis
- ▶ Project is to explore solutions that would reduce the issues related to sand and salt water
- ▶ AND
- ▶ Still allow full function of the prosthetic foot and human knee range of motion

Projects with Danny, Kiara, Stanford & Korey

- ▶ Poop Management Project
- ▶ Treats for Korey
- ▶ Water Bottle Opener
- ▶ Obstacle Detector

Danny is a wheelchair user from Los Gatos with cerebral palsy. He experiences limited upper body strength, grip & vision impairments, and diminished hand & finger dexterity.



On deck: Dave



[Play video](#)

Poop Management Project



- ▶ Explore designs for a poop management system for Danny's service dog Korey.

Treats for Korey



- ▶ Explore solutions that would enable Danny to independently reward Korey.

Water Bottle Opener for Danny



- ▶ Explore designs that would enable Daniel to independently open a water bottle.

Obstacle Detector



- Explore designs to detect curbs, drop-offs, and obstacles and alert Danny.



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



Talk with Project Suggestors to get more
information on projects

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