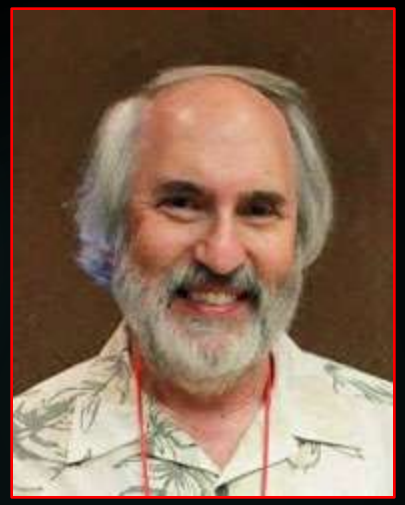
January 12, 2017

Team Project Pitch Day

ENGR110/210
Perspectives in Assistive Technology



David L. Jaffe, MS

Instructor

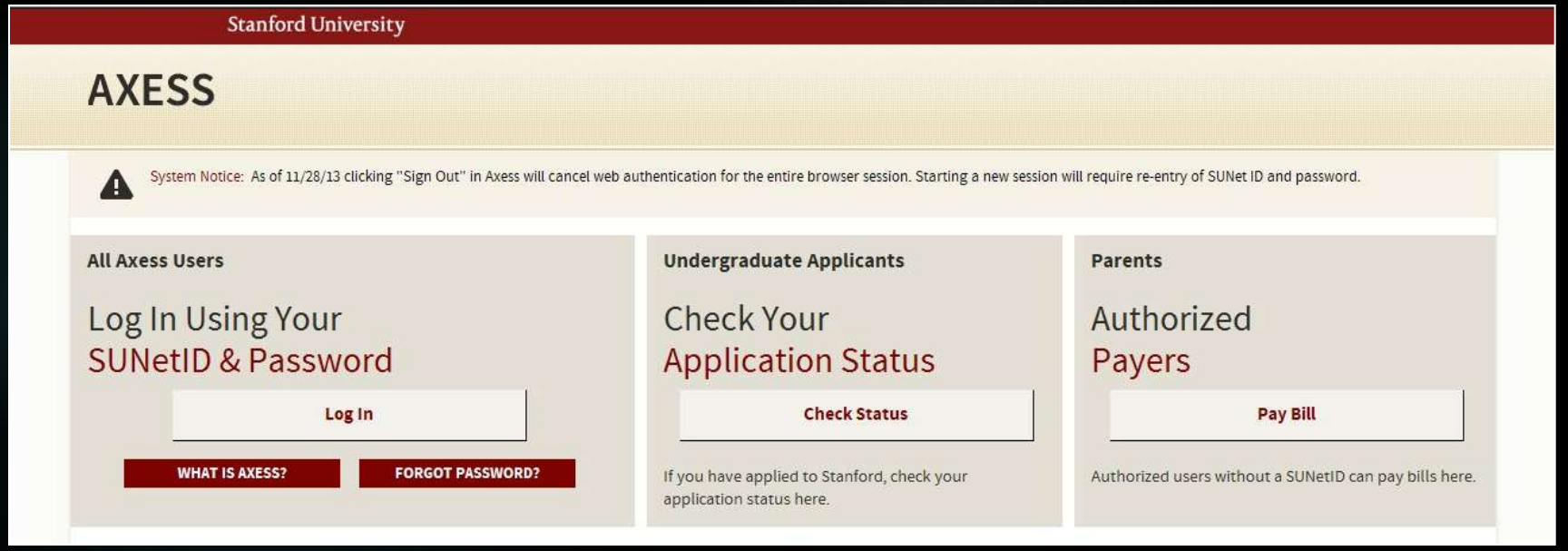
Burning Questions?

Thanks to:

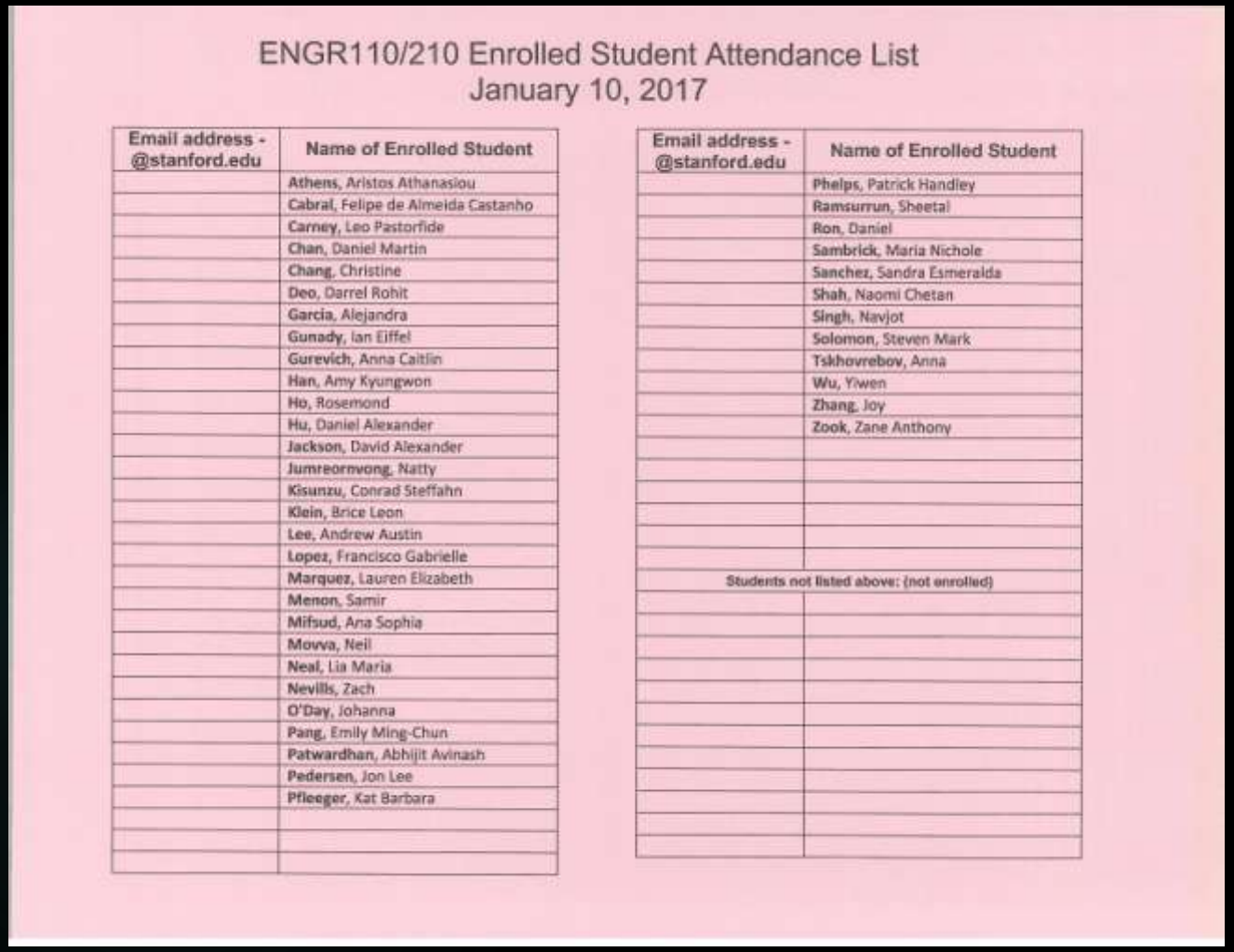
- Students:
  - Enrolling in the course
  - Lecture comments
- Haas Center for Public Service
  - Funding
- Community members
  - Participation and “adding to the conversation”
- Project suggestors
  - Suggesting great projects

Enroll on Axess

Students: If you haven't already done so, please enroll or drop in ENGR110/210 on Axess.



Enrolled Student Attendance Sheet



ENGR110/210 Enrolled Student Attendance List
January 10, 2017

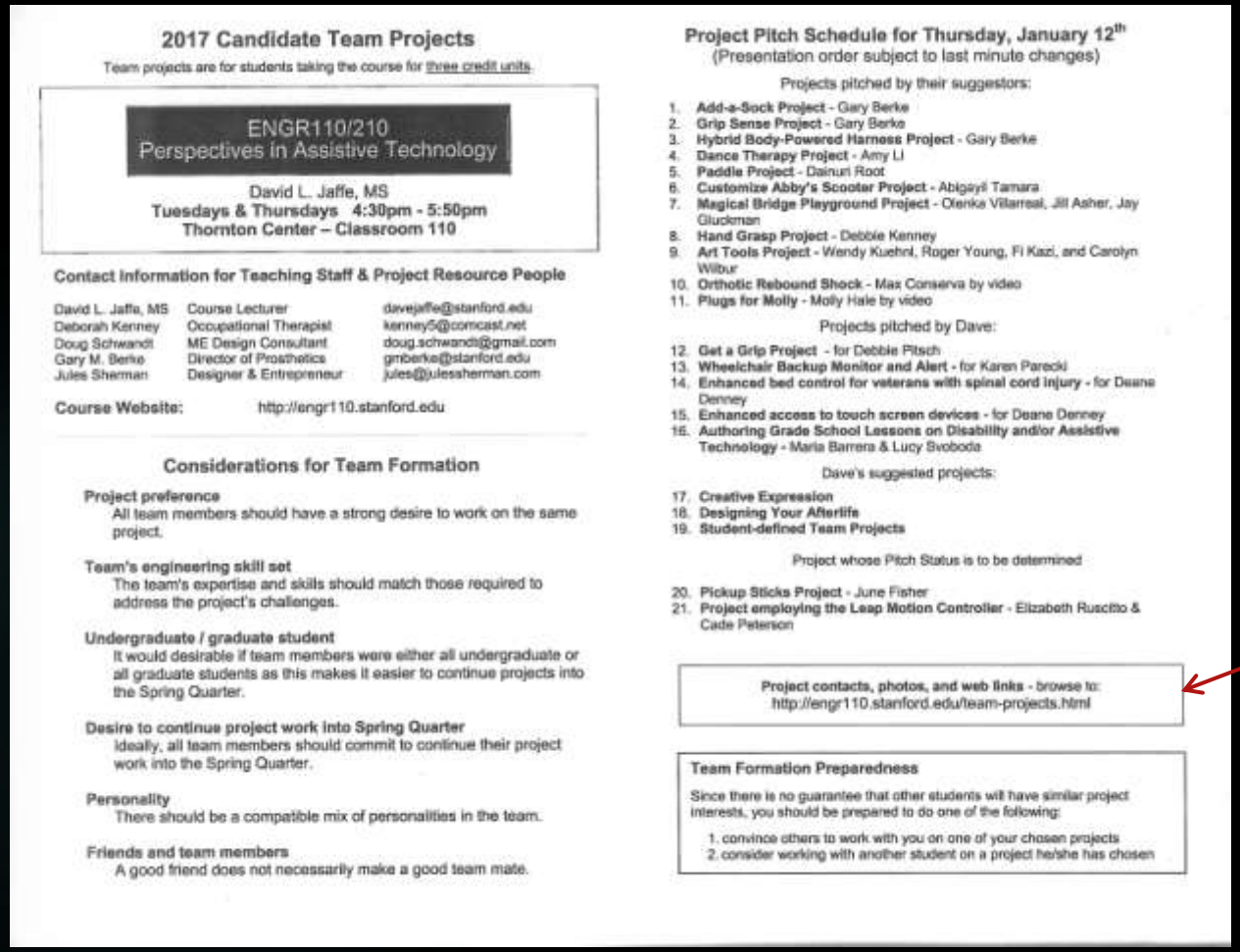
Email address - @stanford.edu	Name of Enrolled Student
	Athens, Aristos Athanasiou
	Cabral, Felipe de Almeida Castanho
	Carney, Leo Pastorfide
	Chan, Daniel Martin
	Chang, Christine
	Deo, Darrel Rohit
	Garcia, Alejandra
	Gunady, Ian Eiffel
	Gurevich, Anna Caitlin
	Han, Amy Kyungwon
	Ho, Rosemond
	Hu, Daniel Alexander
	Jackson, David Alexander
	Jumreornvong, Natty
	Kisunzu, Conrad Steffahn
	Klein, Brice Leon
	Lee, Andrew Austin
	Lopez, Francisco Gabrielle
	Marquez, Lauren Elizabeth
	Menon, Samir
	Mifsud, Ana Sophia
	Movva, Neil
	Neal, Lia Maria
	Nevills, Zach
	O'Day, Johanna
	Pang, Emily Ming-Chun
	Patwardhan, Abhijit Avinash
	Pedersen, Jon Lee
	Pfleeger, Kat Barbara

Email address - @stanford.edu	Name of Enrolled Student
	Phelps, Patrick Handley
	Ramsurrun, Sheetal
	Ron, Daniel
	Sambrick, Maria Nichole
	Sanchez, Sandra Esmeralda
	Shah, Naomi Chetan
	Singh, Navjot
	Solomon, Steven Mark
	Tskhovrebov, Anna
	Wu, Yiwen
	Zhang, Joy
	Zook, Zane Anthony
Students not listed above: (not enrolled)	

<u>All enrolled students:</u>
Please sign this list in every class session to confirm your attendance.

It is important to verify your attendance at every class session

Candidate Team Projects



2017 Candidate Team Projects

Team projects are for students taking the course for three credit units.

ENGR110/210
Perspectives in Assistive Technology

David L. Jaffe, MS
Tuesdays & Thursdays 4:30pm - 5:50pm
Thornton Center – Classroom 110

Contact Information for Teaching Staff & Project Resource People

David L. Jaffe, MS	Course Lecturer	davejaffe@stanford.edu
Deborah Kenney	Occupational Therapist	kenney5@comcast.net
Doug Schwandt	ME Design Consultant	doug.schwandt@gmail.com
Gary M. Berke	Director of Prosthetics	gmberke@stanford.edu
Jules Sherman	Designer & Entrepreneur	jules@julessherman.com

Course Website: http://engr110.stanford.edu

Considerations for Team Formation

Project preference
All team members should have a strong desire to work on the same project.

Team's engineering skill set
The team's expertise and skills should match those required to address the project's challenges.

Undergraduate / graduate student
It would desirable if team members were either all undergraduate or all graduate students as this makes it easier to continue projects into the Spring Quarter.

Desire to continue project work into Spring Quarter
Ideally, all team members should commit to continue their project work into the Spring Quarter.

Personality
There should be a compatible mix of personalities in the team.

Friends and team members
A good friend does not necessarily make a good team mate.

Project Pitch Schedule for Thursday, January 12th

(Presentation order subject to last minute changes)

Projects pitched by their suggestors:

1. **Add-a-Sock Project** - Gary Berke
2. **Grip Sense Project** - Gary Berke
3. **Hybrid Body-Powered Harness Project** - Gary Berke
4. **Dance Therapy Project** - Amy Li
5. **Paddle Project** - Dainuri Root
6. **Customize Abby's Scooter Project** - Abigayil Tamara
7. **Magical Bridge Playground Project** - Otenka Villarreal, Jill Asher, Jay Gluckman
8. **Hand Grasp Project** - Debbie Kenney
9. **Art Tools Project** - Wendy Kuehnl, Roger Young, Fi Kazi, and Carolyn Wilbur
10. **Orthotic Rebound Shock** - Max Conserva by video
11. **Plugs for Molly** - Molly Hale by video

Projects pitched by Dave:

12. **Get a Grip Project** - for Debbie Pitsch
13. **Wheelchair Backup Monitor and Alert** - for Karen Parecki
14. **Enhanced bed control for veterans with spinal cord injury** - for Deane Denney
15. **Enhanced access to touch screen devices** - for Deane Denney
16. **Authoring Grade School Lessons on Disability and/or Assistive Technology** - Maria Barrera & Lucy Svoboda

Dave's suggested projects:

17. **Creative Expression**
18. **Designing Your Afterlife**
19. **Student-defined Team Projects**

Project whose Pitch Status is to be determined

20. **Pickup Sticks Project** - June Fisher
21. **Project employing the Leap Motion Controller** - Elizabeth Ruscitto & Cade Peterson

Project contacts, photos, and web links - browse to: http://engr110.stanford.edu/team-projects.html

Team Formation Preparedness

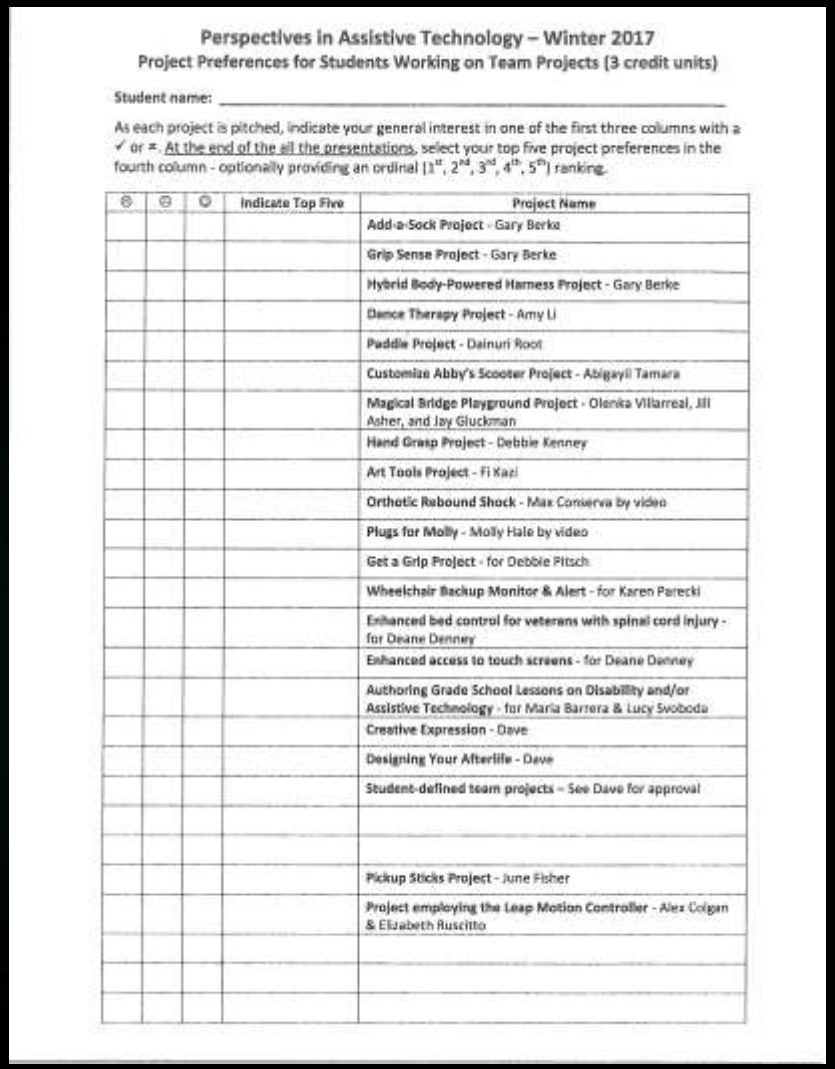
Since there is no guarantee that other students will have similar project interests, you should be prepared to do one of the following:

1. convince others to work with you on one of your chosen projects
2. consider working with another student on a project he/she has chosen

For students taking the course for three credits.

Web links

Today's Handout – Project Preferences for Students working on Team Projects



Perspectives in Assistive Technology – Winter 2017

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
				Add-a-Sock Project - Gary Berke
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				Creative Expression - Dave
				Designing Your Afterlife - Dave
				Student-defined team projects – See Dave for approval
				Pickup Sticks Project - June Fisher
				Project employing the Leap Motion Controller - Alex Colgan & Elizabeth Ruscitto

Tuesday, January 17th

Needfinding and Assistive Technologies

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 Team Formation and Project Selection
4. Project Pitches
5. Open Question Time and Non-Random Access

Course Resource People

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

- Jules Sherman
- Gary M. Berke, MS, CP, FAAOP

Product Realization Lab (PRL)

Craig Milroy

Director of PRL

Marlo Kohn

Associate Director of PRL

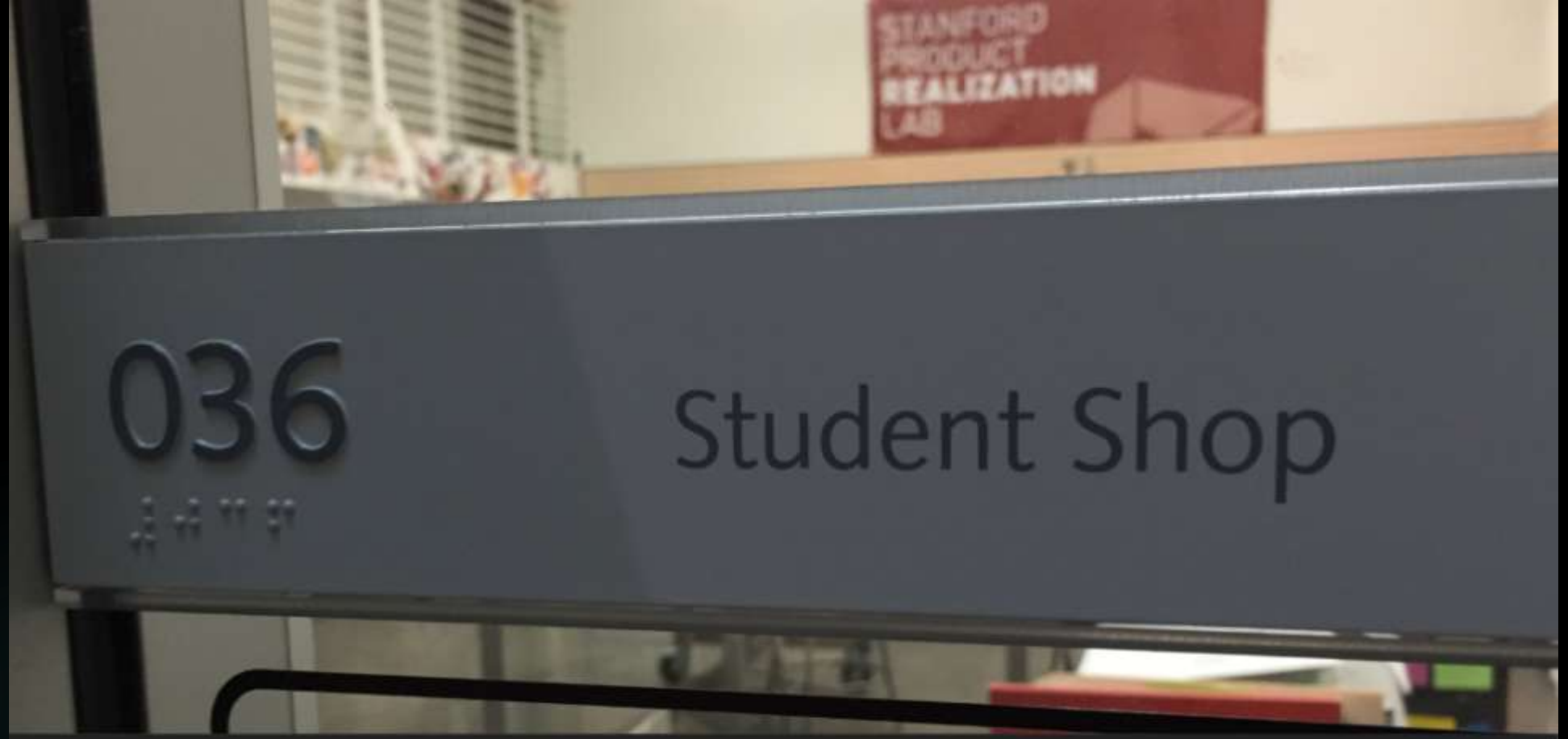
Dan Somen

Manager of Room 36

Five Minute Overview of PRL & Room 36 Resources

- Dan Somen – Manager of Room 36

Video from last year



INTRODUCTION TO ROOM 36

DAN SOMEN

Adjunct Lecturer
Manager of Room 36

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

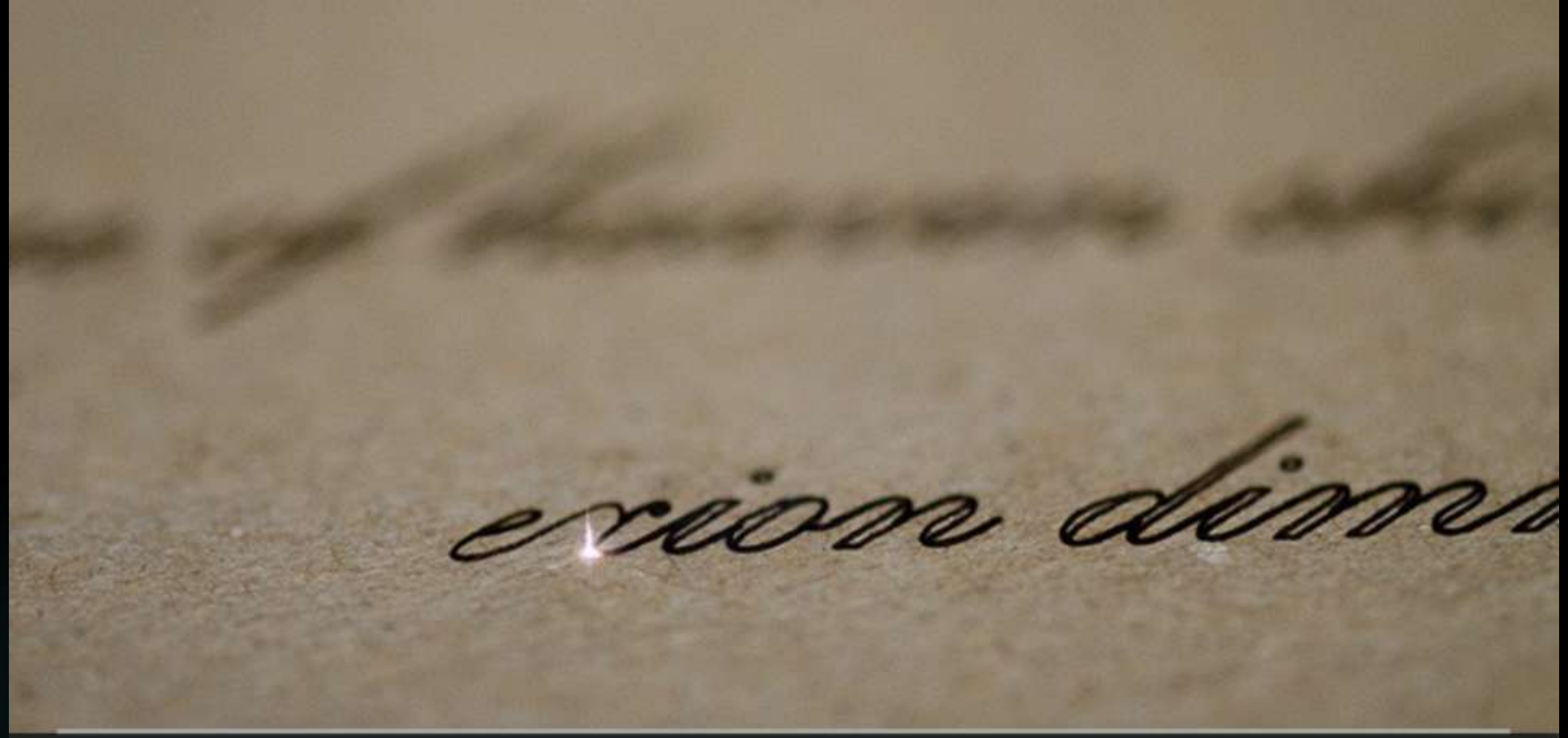
STANFORD PRODUCT REALIZATION LAB

Course Assistants

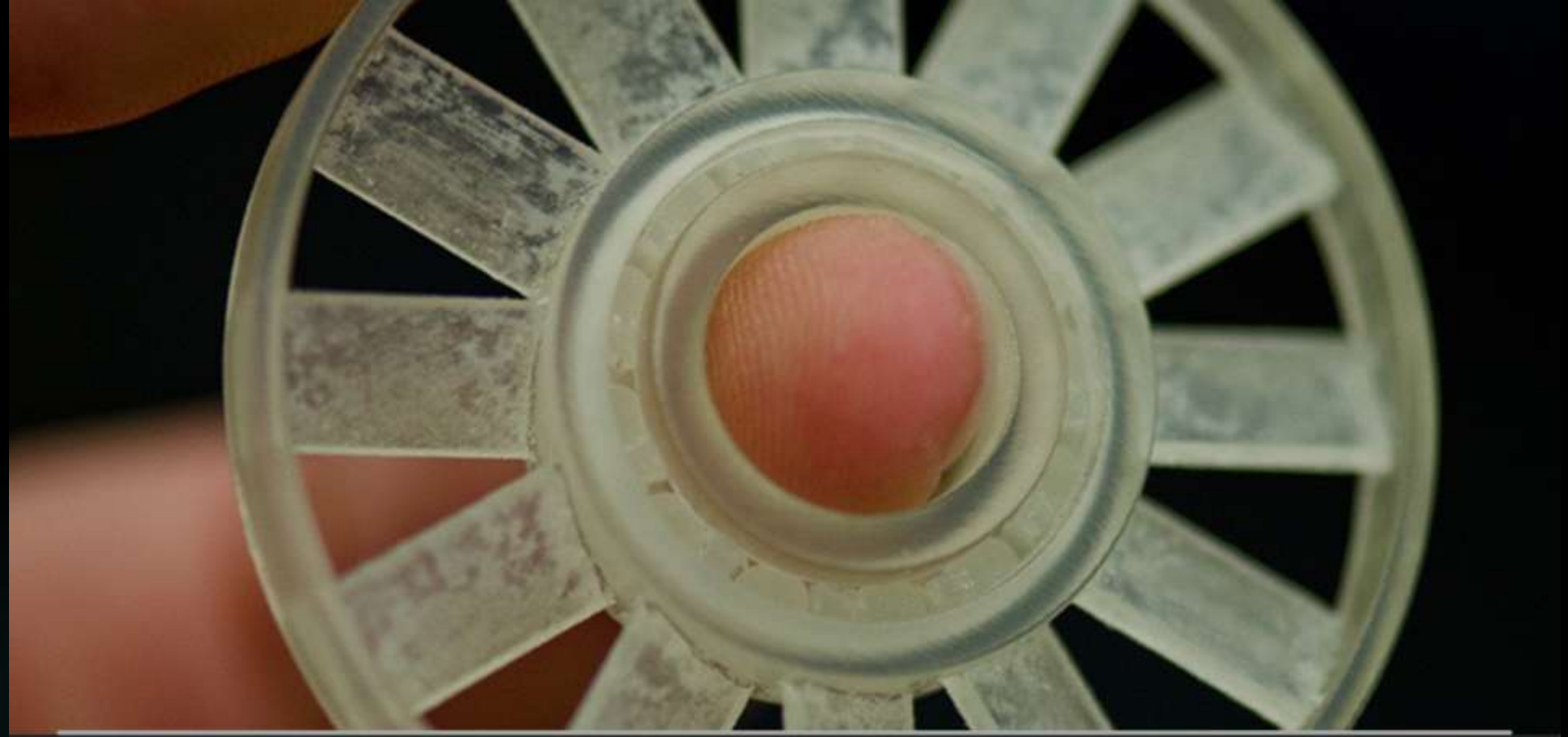
ROOM 36

RAPID PROTOTYPING

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



LASER CUTTING



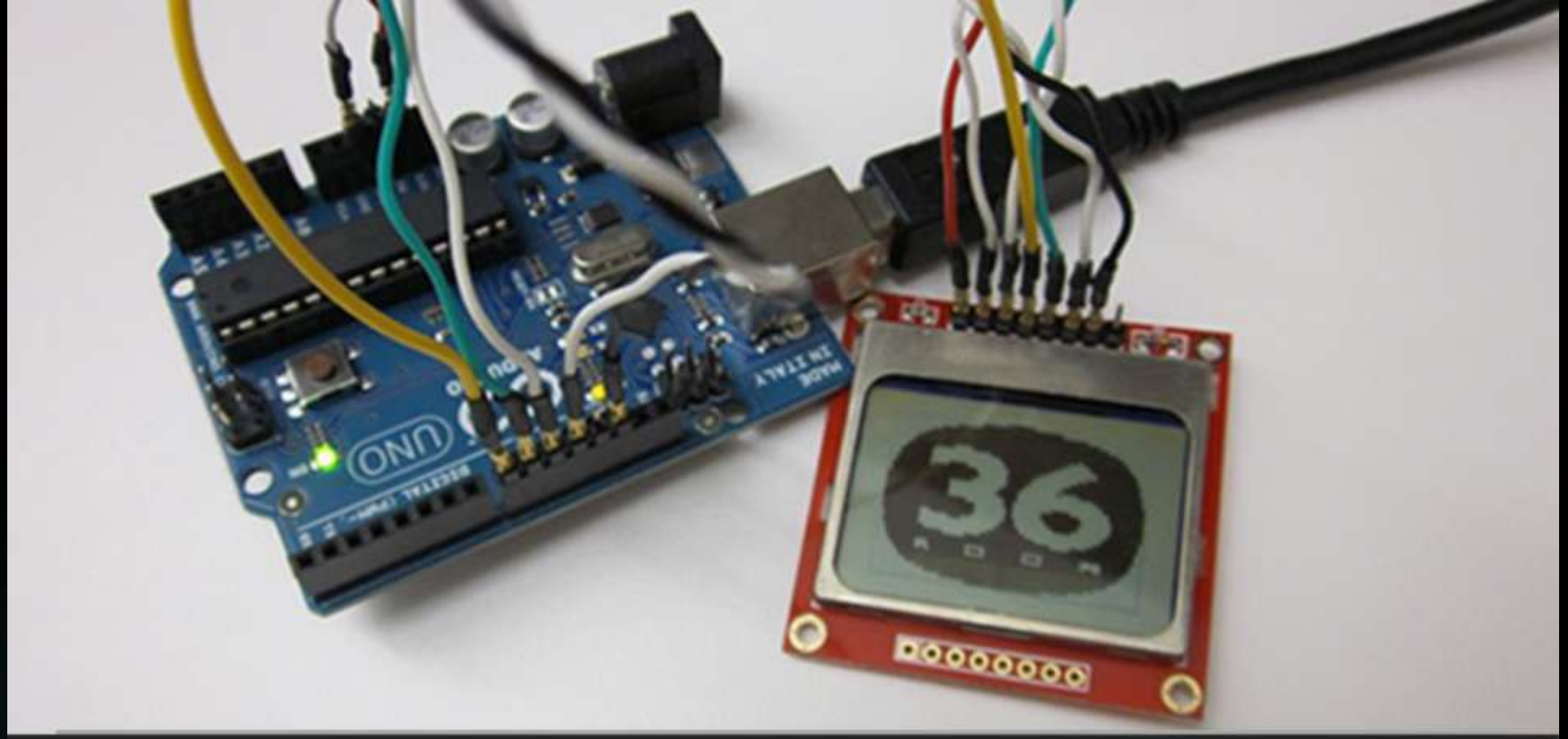
ADDITIVE MANUFACTURING

3D SCANNING

VINYL CUTTING

FOAM CUTTING

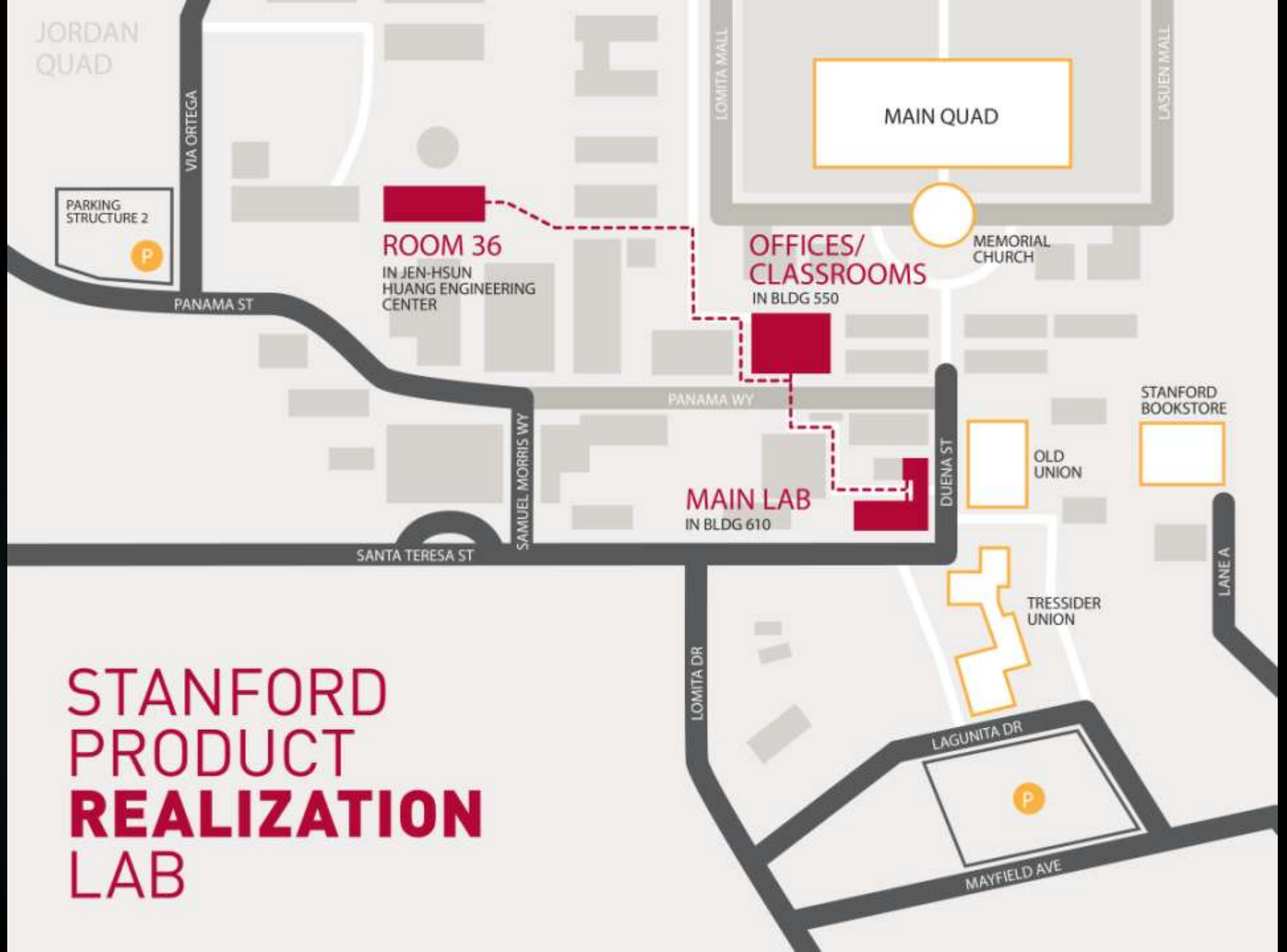
SEWING



ELECTRONICS

MATERIALS

ADVICE


JORDAN QUAD
VIA ORTEGA
LOMITA MALL
LASUEN MALL
MAIN QUAD
PARKING STRUCTURE 2
P
ROOM 36
IN JEN-HSUN HUANG ENGINEERING CENTER
OFFICES/ CLASSROOMS
IN BLDG 550
MEMORIAL CHURCH
PANAMA ST
PANAMA WY
SAMUEL MORRIS WY
DUENA ST
STANFORD BOOKSTORE
OLD UNION
MAIN LAB
IN BLDG 610
SANTA TERESA ST
LANE A
TRESSIDER UNION
LOMITA DR
LAGUNITA DR
P
MAYFIELD AVE
STANFORD
PRODUCT
REALIZATION
LAB

HOW TO GET STARTED

- Visit Webshop https://webshop.stanford.edu
- Create a login profile with your student ID number
- Sign up for a safety orientation (roughly 75 min)
- Pay for a lab pass when you show up for the safety orientation ($60 for 1 quarter, $80 for 2, $100 for the academic year)
- That's it! Then come in and use the PRL!

SEE YOU SOON!

https://productrealization.stanford.edu

Short Break

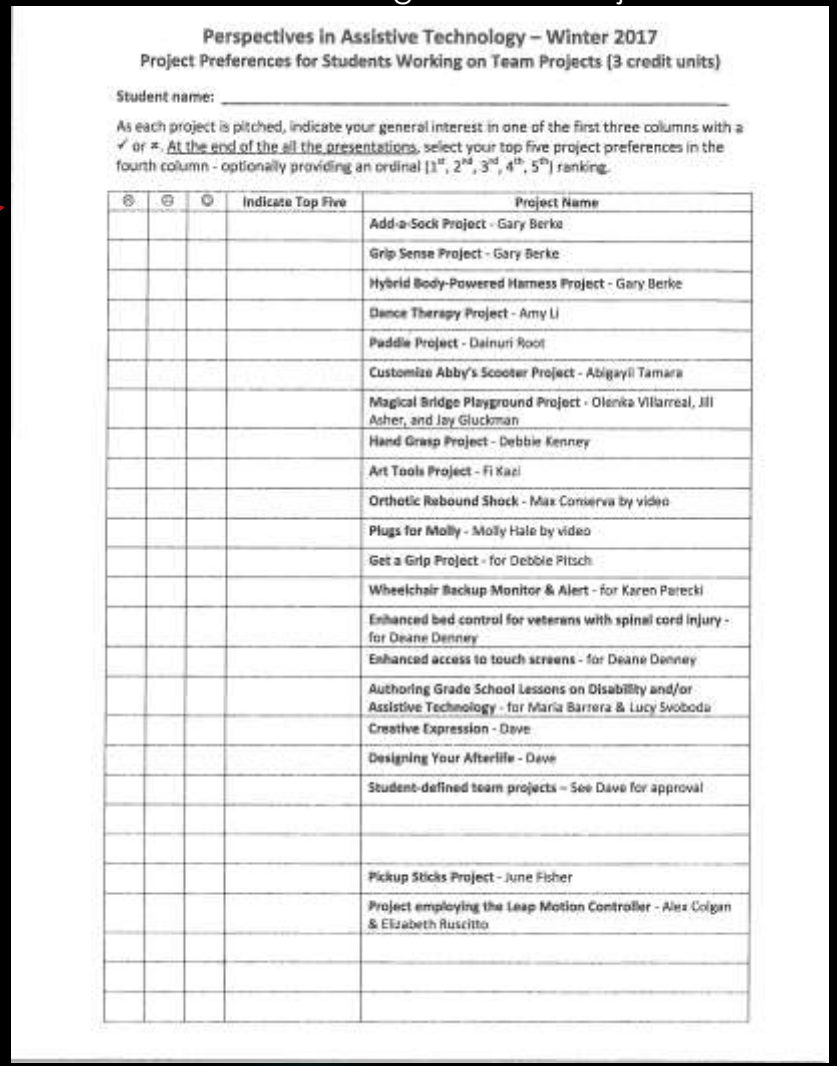
Project Pitches & Team Formation

Project Selection & Team Formation

For those working on **team** projects:

- Read project descriptions
- Fill out Project Preferences Form during pitches
- Talk to project presenters after the pitches
- Hand in Project Preferences Form
- Your preferences will be posted online
  - http://engr110.stanford.edu/preferences.html
- Inform me of team members (teams of no more than 3)
  - Freshmen & Sophomores must work in teams of 2 or 3
  - Name your team
  - Name your project
  - Name your device (after it develops a “character”)

Project Preference Form for
Students Working on Team Projects



Perspectives in Assistive Technology – Winter 2017
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.

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				Creative Expression - Dave
				Designing Your Afterlife - Dave
				Student-defined team projects – See Dave for approval
				Pickup Sticks Project - June Fisher
				Project employing the Leap Motion Controller - Alex Colgan & Elizabeth Ruscitto

Considerations for Team Formation and Project Selection (1 of 2)

Project preference

- All team members should have a desire to work on the same project.

Team's engineering skill set

- Match the team's skills and expertise with the project needs. (Depends on the solution chosen.)

Undergraduate / graduate student

- It would be best if all team members were either undergraduate or graduate students as this makes it easier to continue projects into the Spring Quarter.

Considerations for Team Formation and Project Selection (2 of 2)

Desire to continue project work into Spring Quarter

- Ideally, all team members should commit to continue their project work into the Spring Quarter, but independent study is another option.

Personality

- There should be a compatible mix of personalities in the team.

Friends and team members

- A good friend does not necessarily make a good team mate.

Course load

- Can you spend the time working on a team project? Courses like ME203, ME210, ME218, ME310, and BioE141are very demanding. Are you a TA?

Team Project Preferences

- Preferences will be posted on course website by student and by project:
  - http://engr110.stanford.edu/preferences.html
- Contact project suggestors to get more information
- Review other students' preferences
- Contact them and form teams
- Email Dave with selected project, team name, and team members by Friday, January 20th
- Prepare to "hit the ground running"

Why you may want to

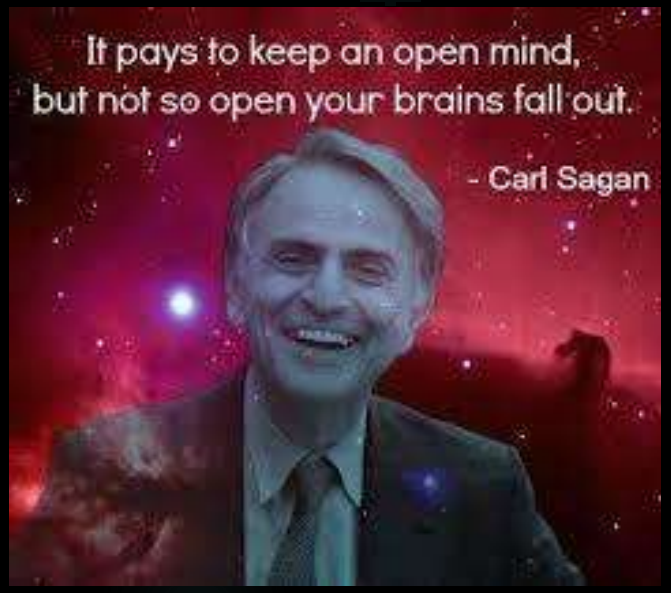
If you have enrolled for three units, you may want to consider taking the course for one unit or waiting until next year if:

1. You are a freshman or sophomore, or
2. If you have limited fabrication experience, or
3. If you are already taking a project course like ME203, ME210, ME218, ME310, BioE141, or …
4. If you have to miss lectures or tours

Team Formation Preparedness

Since there is no guarantee that other students will have similar project interests, you should be prepared to do one of the following:

1. Convince others to work with you on one of your selected projects
2. Consider working with another student on a project he/she has chosen
3. Keep an Open Mind!



Project Selection & Team Formation

For those working on **individual** projects:

- Research an assistive technology topic
- Work on a paper design of an assistive technology device
- Create a work of art
- Engage in an aftermarket aesthetic design
- Engage in an aftermarket functionality / usability design
- Pursue a listed individual project
- These projects are not being pitched

- Meet with Dave for suggestions and approval

Team Projects Pitched by Suggestor

- Add-a-Sock Project - Gary Berke
- Grip Sense Project - Gary Berke
- Hybrid Body-Powered Harness Project - Gary Berke
- Dance Therapy Project - Amy Li
- Paddle Project - Dainuri Root
- Customize Abby's Scooter Project - Abigayil Tamara - by video
- Magical Bridge Playground Project - Olenka Villarreal, Jill Asher, and Jay Gluckman
- Hand Grasp Project - Debbie Kenney
- Art Tools Project - Gautam Dandavate, Wendy Kuehnl, Roger Young, Fi Kazi, and Carolyn Wilbur

Team Projects Pitched by Video

- Orthotic Rebound Shock - Max Conserva
- Plugs for Molly - Molly Hale
- Authoring Grade School Lessons on Disability and/or Assistive Technology - Maria Barrera & Lucy Svoboda

Projects Suggested by Others, Pitched by Dave

- Get a Grip Project - for Debbie Pitsch
- Wheelchair Backup Monitor and Alert - for Karen Parecki
- Enhanced bed control for veterans with spinal cord injury - for Deane Denney
- Enhanced access to touch screen devices - for Deane Denney
- Pickup Sticks Project - June M. Fisher
- Project employing the Leap Motion Controller - Alex Colgan & Elizabeth Ruscitto

Projects Suggested by Dave

- Creative Expression
- Designing Your Afterlife
- Student-defined projects

On deck: Gary Berke

Prosthetics Projects

- Prosthetics Projects - Gary Berke
  - Add-a-Sock Project
  - Grip Sense Project
  - Hybrid Body-Powered Harness Project

On deck: Amy Li

Add-a-Sock Project

- Add-a-Sock Project - Gary Berke

- Explore designs for a simple pressure sensor system, to fit unobtrusively inside a prosthetic device, to alert the user when it is time to add (or remove) a sock.

Add-a-Sock Project

Grip Sense Project

- Grip Sense Project - Gary Berke

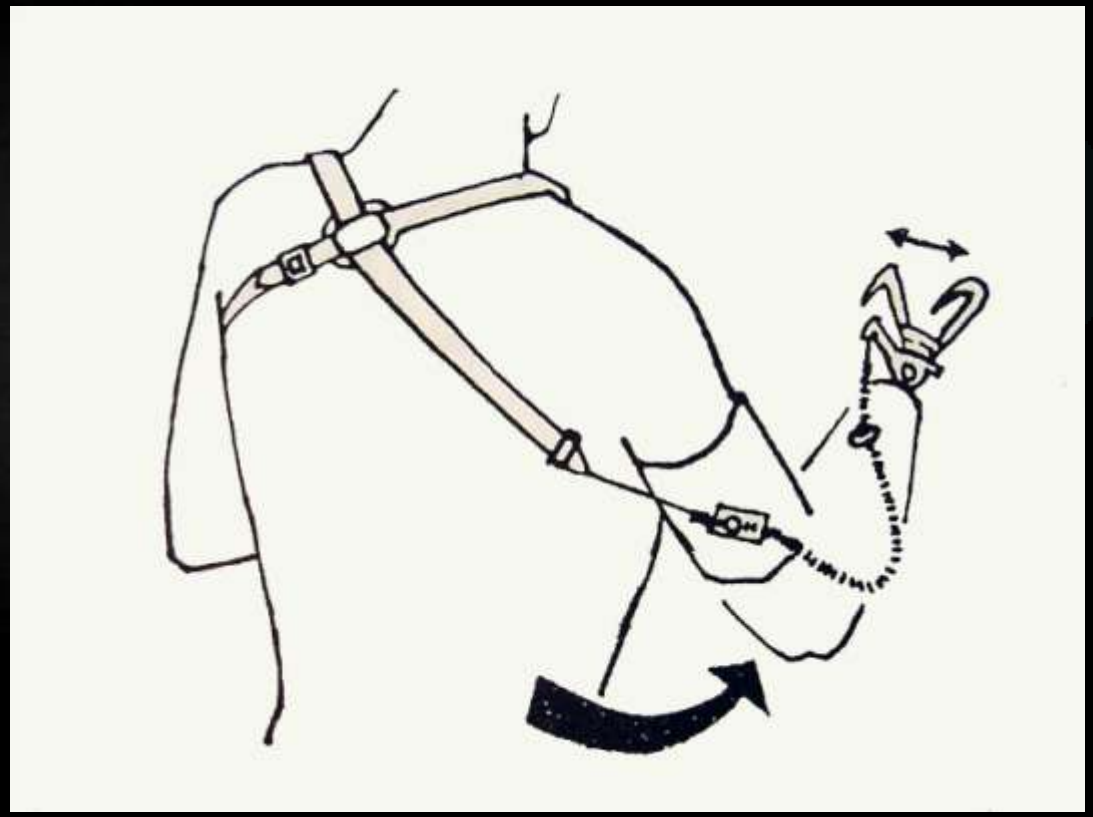
- Explore designs for a simple sensor system that will inform the user of the grip strength being produced by his/her prosthetic device. The sensing modality must be something other than vibration.

Grip Sense Project

Hybrid Body-Powered Harness Project

- Hybrid Body-Powered Harness Project - Gary Berke
- Explore alternative ways of controlling a body-powered prosthetic device, perhaps using electronic sensors and electromechanical systems.

Hybrid Body-Powered Harness Project



Dance Therapy Project

- Dance Therapy Project - Amy Li

- Explore designs to provide encouragement and enhance the dance therapy experience for both wheelchair users and individuals who can not stand for long periods.

On deck: Dainuri Root

Dancing Frequently Reduces the Risk of **Dementia by 76%!**

New England Journal of Medicine, 2003

Dancing Reduces 50% Cardiovascular Disease Death

American Journal of Preventive Medicine, 2016

Creative Arts Therapy (Music/Dance/Art) Improves Cancer Patients'

Quality of Life by 50%, Reduces Pain by 59%!

The JAMA Network, 2013

Exercise May Make Tumors Less Aggressive

American Cancer Society, 2015

Penguin Coldcap to Save My Hair from Chemo

Isolated, Lonely, Depressed, Tough Behavior Challenge

11 million
28% seniors
live alone

U.S. Census Bureau 2010

Dance 4 Healing

Stop for Now


Video link 0:10

Imagine...

1 Visual Feedback?

- Colorful lights?
- Seasonal celebration?

2 Vibration Pads?

- Directional guidance?
- Synchronize with music or singing?

3 Tracking Movement? Auto Response?

- Provide feedback, encouragement?
- Confirm movement efficacy
- Personalized recommendation using AI?

Video link 0:09

Paddle Project

- Paddle Project - Dainuri Root

- Explore designs that would provide individuals with an upper body weakness due to age or impairment with an awesome on-the-water paddling experience.

On deck: Abigayil Tamara

GoodLife Mobility

Assistive Water Mobility and Water Sports

Dainuri Rott, founder

Jesse Billauer

Fernanda Castelo

Human Machine Interface (HMI)

Sipa Board

- **FEATURES, TOP TO BOTTOM**

- CLASSIC POWER ON BUTTON

- ONE DOT --- SLOW
- TWO DOTS --- MEDIUM
- THREE DOTS --- FAST

- Setting are push button, one push off

- INDUCTIVE CHARGING OF BATTERY

Current Drives Wireless interface

- **FIVE BUTTONS PLUS DISPLAY TOP CENTER**

- INCREASE SPEED
- DECREASE SPEED
- FORWARD
- REVERSE
- STOP

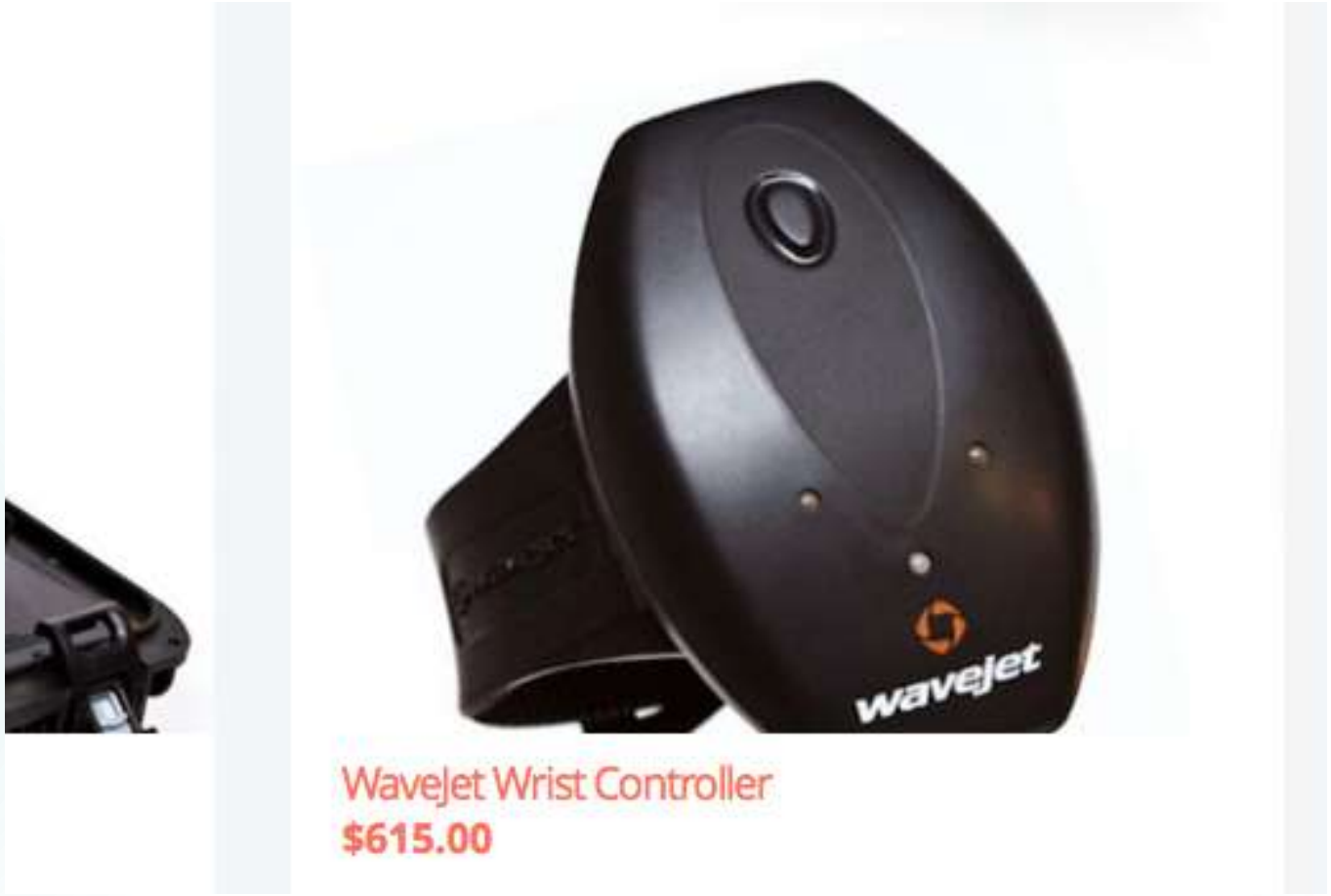
WaveJet SUP Wireless Interface

Wrist Module

Operation:

- "One touch on, one touch off."
- *Danger:* If rider falls off while switch is on - board keeps going.
- Two hands - for SUP you must take one hand off of the paddle!
- "Sea Tooth" turns power off if board and wireless too far apart (3 to 5 meters.)

New WaveJet South Africa, ***nothing new***
this is off of their current website



DJM Paddle Integrated Wireless

CENTER OFF, SWITCH DEPRESSED

TO THE LEFT = SLOW, RIGHT= FAST

Operation:

- Works naturally as you grip paddle
- 2-position rocker switch, FAST AND SLOW
- “Deadman” safety feature: spring return to center ***off***
- 2 programmable switch speeds, 2 to 7 mph
- Simple, safe, and reliable

DJM TWO VARIATIONS OF FOOTBALL KAYAK ON LEFT, SUP ON RIGHT

Issues

- Buttons to Push
- Safety
- No Run-away situations

Is there a better Assistive Paddle Sport HMI solution?

GoodLife Mobility meets ENGR110 / 210

Customize Abby's Scooter Project

- Customize Abby's Scooter Project - Abigayil Tamara
- Explore designs to add a personal aesthetic and enhance visibility to Abby's scooter

Video from last year's pitch

On deck: Magical Bridge Playground

Customize Abby's Scooter

Abigayil Tamara

About Me

I am mobility impaired, 4’11” tall and am 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 different organizations. My scooter, a TravelScoot Junior Deluxe, is lightweight, very plain, and low to the ground.

About My Scooter

The TravelScoot Junior Deluxe is a version for smaller people, generally anyone from approximately 4’ 6” (140 cm) to 5’ 3” (160 cm) in height and of regular build. The scooter frame is made from high-strength 7075 Aluminum (Aircraft Grade). The Deluxe weighs 35 lbs (16 kg) and features a lithium-ion battery.

Scooter Specifications

- Junior-Size Unfolded:
  - 34” (86 cm) x 20” (51 cm) x from 24” (61 cm) to 35” (89 cm)
- Folded with Front Wheel:
  - 30” (76 cm) x 15” (38 cm) x 10” (25 cm)
- Battery charger and charging: 100 to 240 Volts;
- Li-ion: 1.6 Ah, 8 hours;
- Top speed: 3.75 mph (6 kph)
  - maximum allowed for non-licensed motor vehicles
- Wheel size (dia. x width):
- Front: 8” (20 cm) x 2” (5 cm)
- Rear: 8” (20 cm) x 2.75” (7 cm)
- Maximum capacity: 320 lbs (145 kg)

My Customizations & Needs

I have attached a plastic container, with Velcro, to give me more carrying ability. My carrying needs include having water, snacks, and a blanket for my service dog, as well as refreshments, and materials for conventions / meetings for myself .

My Scooter Desires

It would be wonderful to have alternative looks to:

- Be able to dress up for presentations
- Be able to be sporty when I am hiking
- Be expressive in color and design to show my creative side
- Be visible for going through crowded areas.

Photos without Plastic Container

Photos with Plastic Container

Design Criteria

- Must not damage the scooter
- Must not restrict driving controls
- Must be “undoable”, removable, washable
- Consider a variety of usage occasions
- Consider fabrics, colors, finishes, patterns, and Abby’s aesthetic preferences
- Consider designs that enhance nighttime visibility

Magical Bridge Playground

Two Projects

- Magical Bridge Playground Project - Olenka Villarreal& Jill Asher & Jay Gluckman
- Explore designs to offer a new and innovative play and educational experiences incorporating multiple senses, actions, and outcomes.
- Consider 1) a design that employs tactile / haptic sensing including Braille or 2) an object that generates sounds (or sound effects) when it is touched, pushed, shaken, turned, stepped on, etc. Also consider "sound-ifying" existing playground equipment.

On deck: Debbie Kenney

Magical Bridge Playground Projects

Magical Bridge Playground founder, Olenka Villarreal often says, "The playground is a child's first classroom.“

Introducing children as early as possible to the variety of people in their community is our best hope for removing social and physical barriers.

“Accessibility” Just Isn’t Enough

- Not a single public playground has been designed with everyone’s unique play needs in mind.
- Magical Bridge Foundation was created to assist and partner with additional communities who want their own Magical Bridge Playgrounds.
- Magical Bridge Foundation is sparking a national conversation about how parks must serve the many kinds of people who live in the community.
- ADA standards do not meet the needs of many living with a disability.

Magical Bridge Playground, Palo Alto

- Seven Unique Zones: Playhouse & Tree Deck; Slide Mound; Spinning Zone; Picnic & Performance Area; Swinging and Swaying Zone; Music Zone; Tot Play Zone
- Playhouse is two stories and Tree Deck has two bridges including a “rope” bridge - the entire structure is wheelchair accessible.
- Playground features are a mix of custom designed equipment and off-the-shelf technology often applied in unique ways.
- Seven years of research went into the playground design.

Magic is Coming to Redwood City!

Magical Bridge Playground is mindfully designed to deliver significant benefits to people of all ages and abilities. Magical Bridge Playground in Redwood City will feature elements inspired by the area's unique landscape and the values of the community.

The play zones planned for Redwood City's Red Morton development include:

- Innovation Zone
- Music Zone
- Tot Zone
- Spin Zone
- Kindness Corner
- Slide Mound
- Swing & Sway Zone
- Picnic & Group Area
- Playhouse & Stage

Magical Bridge Playground, Palo Alto

Sound Exploration at Magical Bridge Playground

Computer generated harp and keyboard sounds are triggered by sensors mounted on the underside of the arch

Kinder Bells

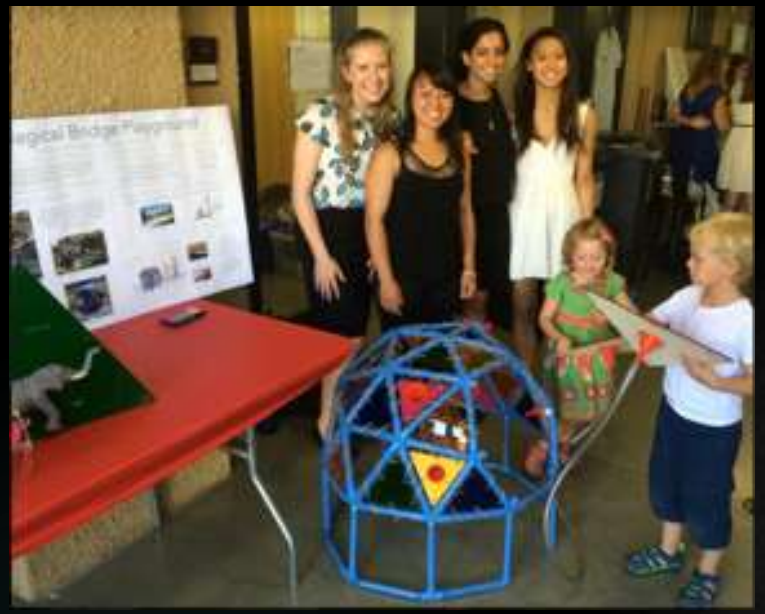
The tops of welding cylinders have been cut with a torch and repurposed as bells.

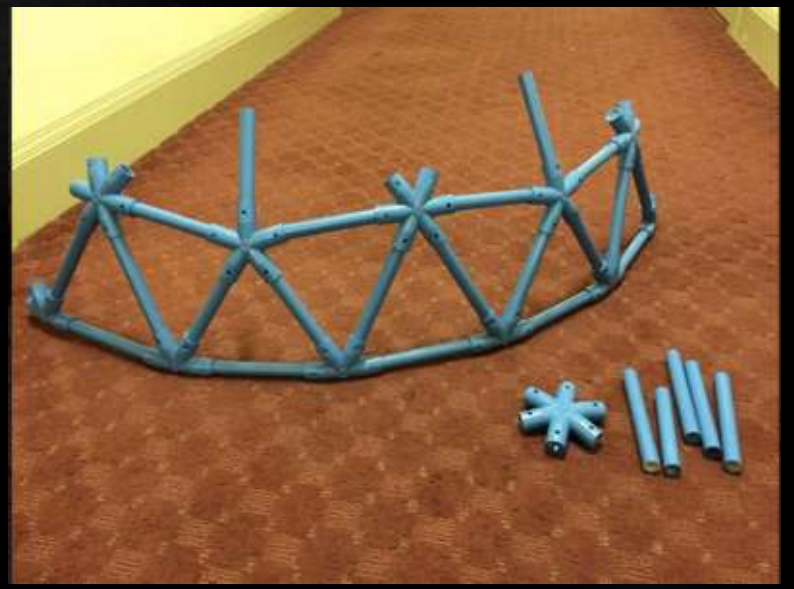
Sound Exploration at Magical Bridge Playground

"Stepping Sounds" by George Zisiadis

An X-band radar "senses" the footsteps of people passing by and triggers computer generated footstep sounds.

Previous Prototypes





ENGR110 Prototypes from 2016

- Team worked collaboratively on overall structure to mount prototypes.
- Individual team members each focused on individual prototypes.

- QR Codes with links or text to provide information for the visually impaired
- Pick up and play musical instrument.
- Tactile puzzle with slideable pieces.
- Slideable bead exploration.
- Tactile Braille exploration for the visually impaired and the sighted.

Notes regarding the Prototyping for Magical Bridge Playground

- There will be an opportunity to get information about the project and feedback about teams' fabricated prototypes on site from playground visitors.
- The prototypes can be as rough or refined as your team chooses - we just want to understand your vision about how your design would work in an actual playground application.
- Prototypes can be strictly mechanical, structural, electrical, or conceptual or some combination thereof.
- Student prototypes will not necessarily be installed in a playground.

Be Part of the Magic - Join Us!

MAGICAL BRIDGE FOUNDATION

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Hand Grasp Project

- Hand Grasp Project - Debbie Kenney
- Explore designs to add a grasping / holding and releasing functionality for stroke survivors.

On deck: Gautam Dandavate

Hand Grasp Project

For Karin Halkens

Presented by Deborah Kenney MS OTR/L

Karin

Survivor of a burst cerebral aneurysm

Former passions: tennis, skiing, crafting

Current right side hand function

However, her arm function is very good!

How do you remove your watch?

Video link 0:11

What Karin would like

- A dynamic device that would allow for her to perform (gross) grasp and release with a variety of objects on her right side.

Art Tools Project

- Art Tools Project - Gautam Dandavate ,Wendy Kuehnl, Roger Young, Fi Kazi, and Carolyn Wilbur

- Explore designs that would allow artists with developmental disabilities or range of motion and muscle / motor control challenges to be more independent and increase their ability to participate in art.

Video from last year's pitch

On deck: Max's video

Art Tools Project

- **ABILITIES UNITED**

- ***Gautam Dandavate***
  Art Program Volunteer & Stanford ME alumnus

- Non-profit organization in Palo Alto, CA.
- Providing support and services to ***people with developmental and physical disabilities*** in the San Francisco Bay Area since 1963.
- ***Art Program*** - Since 2000, our mission has been to ***provide artists of all abilities*** and backgrounds access to the Bay Area art community, by providing **opportunities to create, exhibit, and sell their art**.

Art Tools Project

- Examples of art work by Abilities United Art Program participants - more here

Philip Ma
Venice, 2013
Acrylic on canvas

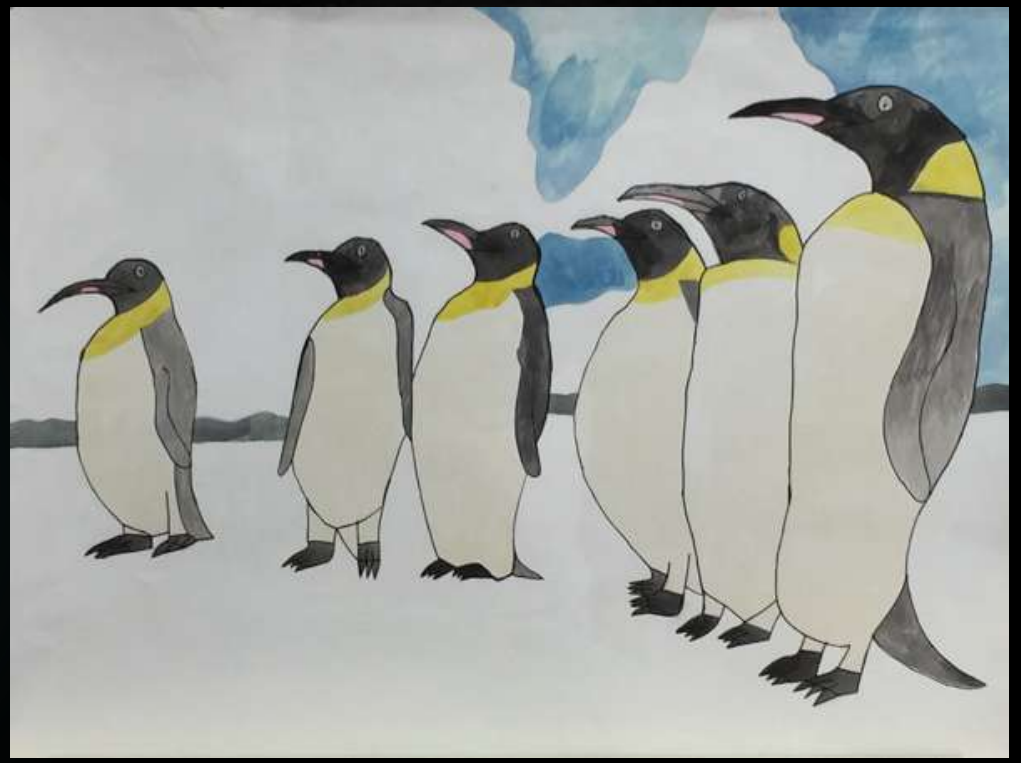
Daniel Arroyo
Boots, 2013
Charcoal

Daniel Arroyo
Servant, 2016
Oil on canvas

Art Tools Project

- Examples of art work by Abilities United Art Program participants - more here

Judy Wachner
Pursed Lips, 1997
Pastel



Michael Broadhurst
Emperor Penguins
Watercolor and ink

Matthaus
Platypus, 2016
Ceramic

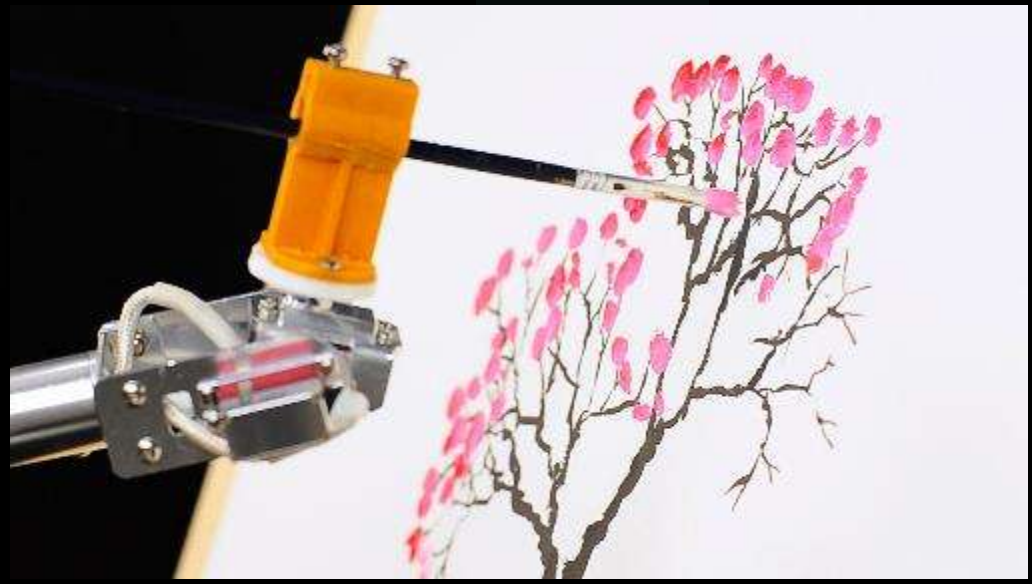
Matthaus
Chameleon, 2016
Aluminum Foil

Art Tools Project

- **AIM STATEMENT**
- We invite you to ***explore designs that allow people with disabilities the opportunity to express their artistic side more easily and independently***.

'Glifo' customizable writing utensils

'Zot Artz' art roller



'7Bot' robotic arm

Art Tools Project

- **COMMON PROBLEMS FACED BY ABILITIES UNITED PARTICIPANTS**
- People ***who use wheelchairs*** or those with ***limited of range mobility*** (particularly arms, hands, and neck) can ***find standard art-making tools*** (such as pencils, pens, paint brushes, paint trays, tables, easels, etc.) ***difficult to use***.

Participant with difficultly gripping color pencil, holding paper in place, and looking down at work.

"Hand over hand" technique with an assistant is usually employed in these cases. However, this can stifle creativity and self expression.

Art Tools Project

- **COMMON PROBLEMS FACED BY ABILITIES UNITED PARTICIPANTS**
- Participants who are ***nonverbal*** and use other unique communication skills ***find it difficult to express their artistic ideas and desires***.

Participant who is nonverbal unable to communicate what art activity he is interested in. In such cases, participants can only follow the lead of the assistant.

Art Tools Project

- **DESIGN CRITERIA**

- Addresses ***significant problem*** faced by ***several*** artists with disabilities (i.e. not only a handful of special cases).
- Age appropriate - ***targeted for adults***.
- ***Engages interest*** in user for ***continued periods of time***.
- Promotes ***independent work***, with minimal assistance required.
- ***Easy*** to learn and use.
- ***Safe*** to use.
- ***Affordable*** - geared towards non-profit community.

Orthotic Rebound Shock

- Orthotic Rebound Shock - Max Conserva
- "Explore designs for a mechanism, attached to my existing knee brace, that would improve its stability and provide a significant elastic rebound during deep knee flexion. The device would serve as a shock absorber by dampening knee flexion and storing the energy for rebounding the knee into extension.“
- Video link 3:31

On deck: Molly’s video

Plugs for Molly

- Plugs for Molly - Molly Hale
- Explore designs for cords (power, USB, and charging) that would facilitate their handling, plugging-in, and unplugging for individuals with impaired grip and hand/arm function like Molly.
- Video link 2:48

On deck: Nearpod video

Authoring Grade Schools Lessons on Disability and/or Assistive Technology

- Authoring Grade School Lessons on Disability and/or Assistive Technology - Dave for Maria Barrera & Lucy Svoboda, Nearpod
- Author Nearpod lesson modules on Disability and/or Assistive Technology suitable for use in a grade school classroom.

- See Individual projects

Video from last year's pitch

Projects Suggested by Others, Pitched by Dave

- Get a Grip Project - for Debbie Pitsch
- Wheelchair Backup Alert - for Karen Parecki
- Enhanced bed control for veterans with spinal cord injury - for Deane Denney
- Enhanced access to touch screens - for Deane Denney
- Pickup Sticks Project - June M. Fisher
- Project employing the Leap Motion Controller - for Alex Colgan & Elizabeth Ruscitto

Get a Grip Project

- Get a Grip Project - Dave for Debbie Pitsch - VA Palo Alto Health Care System, Spinal Cord Injury Service

- Explore designs that would enhance a handbike user's with quadriplegia ability to pedal the Freedom Ryder.

Wheelchair Backup Monitor & Alert

- Wheelchair Backup Monitor and Alert - Dave for Karen Parecki - VA Medical Center, Spinal Cord Injury Service

- Explore mechanical or electronic designs to provide rearward visibility and warning while backing up

Two projects:
monitoring and alert

Enhanced Bed Control

- Enhanced bed control for veterans with spinal cord injury - Dave for Deane Denney

- Explore solutions that would enable veterans to more easily operate their beds, including voice activation.

Enhanced Access to Touch Screens

- Enhanced access to touch screens - Dave for Deane Denney

- Explore ideas that would enable users with limited hand control to make their selections more accurately on their personal touch screen devices.

Pickup Sticks Project

- Pickup Sticks Project - Dave for June M. Fisher
- Explore designs that will add a mechanism to walking sticks that would facilitate picking up small objects on the floor.






Project Employing the Leap Motion Controller

- Project employing the Leap Motion Controller - Elizabeth Ruscitto

- Explore an application for a person with a disability using the Leap Motion Controller product. Examples include enhanced computer control and accessibility for those with limited manipulation abilities, physical therapy coach, control of household appliances (lights, TV, music system), operation of Bluetooth devices (iPhone), and implementation of an on-screen keyboard.

Project Employing the Leap Motion Controller

Project Employing the Leap Motion Controller

- Leap Motion tracking makes it possible to interact with virtual spaces using your bare hands, with tracking at the fingerbone level.

Project Employing the Leap Motion Controller

- Using the Leap Motion Controller with a VR headset like the Oculus Rift, you can bring your hands into virtual reality and interact directly with digital objects..

Project Employing the Leap Motion Controller

- The Leap Motion system recognizes and tracks hands, fingers, and finger-like tools. The device operates within 60 cm of the user with high precision and tracking frame rate - reporting discrete positions, motions, and gestures.

  - Handedness (left or right)
  - Bones and joints from elbow through fingertips
  - Position, length, radius & orientation of each bone
  - Tracking confidence

Project Employing the Leap Motion Controller

- Medical Applications - *Early Community Experiments*

Project Employing the Leap Motion Controller

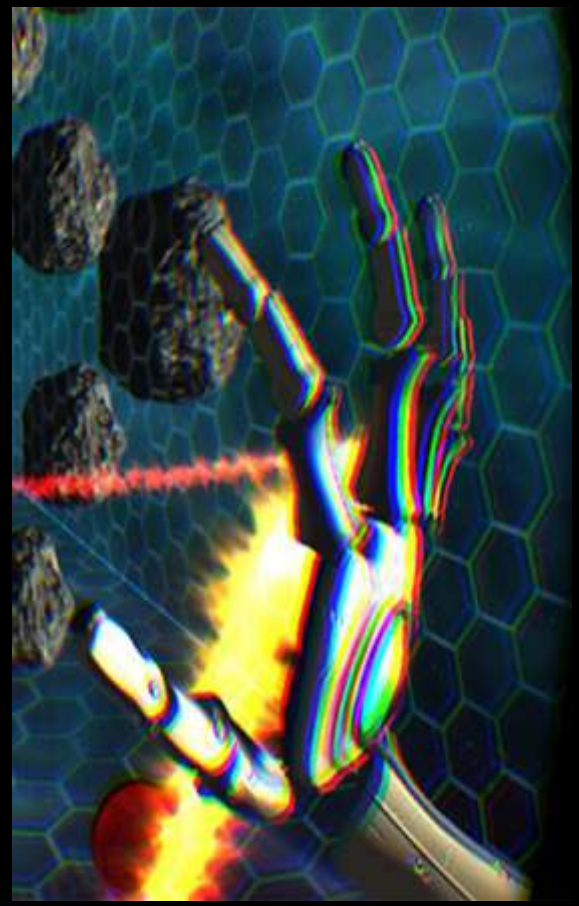
- Hearing Loss - Hundreds of thousands of people use American Sign Language in their daily lives.
- Problem: From the home to the workplace and everywhere in between, deaf people face serious communication barriers.
- Solution: One of TIME Magazine's Top 25 inventions of 2014, Motion Savvy's UNI is a two-way communication tool for the deaf using Leap Motion and speech technologies.

Project Employing the Leap Motion Controller

- Hand Tremors - Parkinson's disease, Wilson's disease, dystonia, and other diseases make everyday life difficult for millions of people.
- Problem: There aren't many ways for patients and doctors to quickly and reliably track tremor progression over time.
- Solution: Developers and researchers have been experimenting using Leap Motion technology to measure hand tremors, including a team at UCSF.

Project Employing the Leap Motion Controller

- Vision Disorders - Cross-eye and lazy eye happen when the human brain ignore input from the non-dominant eye.
- Problem: There aren't many ways to retrain people's brains beyond boring clinical exercises.
- Solution: A dash of gamification. Vivid Vision believes that VR and motion controls can trick the player's brain into strengthening their weaker eye. Their technology is now rolling out to eye clinics.



Project Employing the Leap Motion Controller

- Physical Therapy - After a stroke or other crippling illness, patients have a long road to restoring normal function to their hands.
- Problem: Rehab exercises can feel unrewarding and repetitive. Patients often need to stay at large facilities because the technologies they need are expensive and difficult to set up.
- Solution: The Burke Research Institute, Ten Ton Raygun, and others have designed experimental games for stroke patients using Leap Motion technology.

Dave's Suggested Projects

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

Creative Expression

- Creative Expression

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

Designing Your Afterlife

- Designing Your Afterlife

- 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.

Student-defined Team Projects

- Student-defined Team Projects

- 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

Fun at the Beach - Individual Project

- Explore designs for a wheeled mobility device that would allow Jessa, an extremely active 8 year old girl with one leg, to explore the beach and engage in typical beach activities.

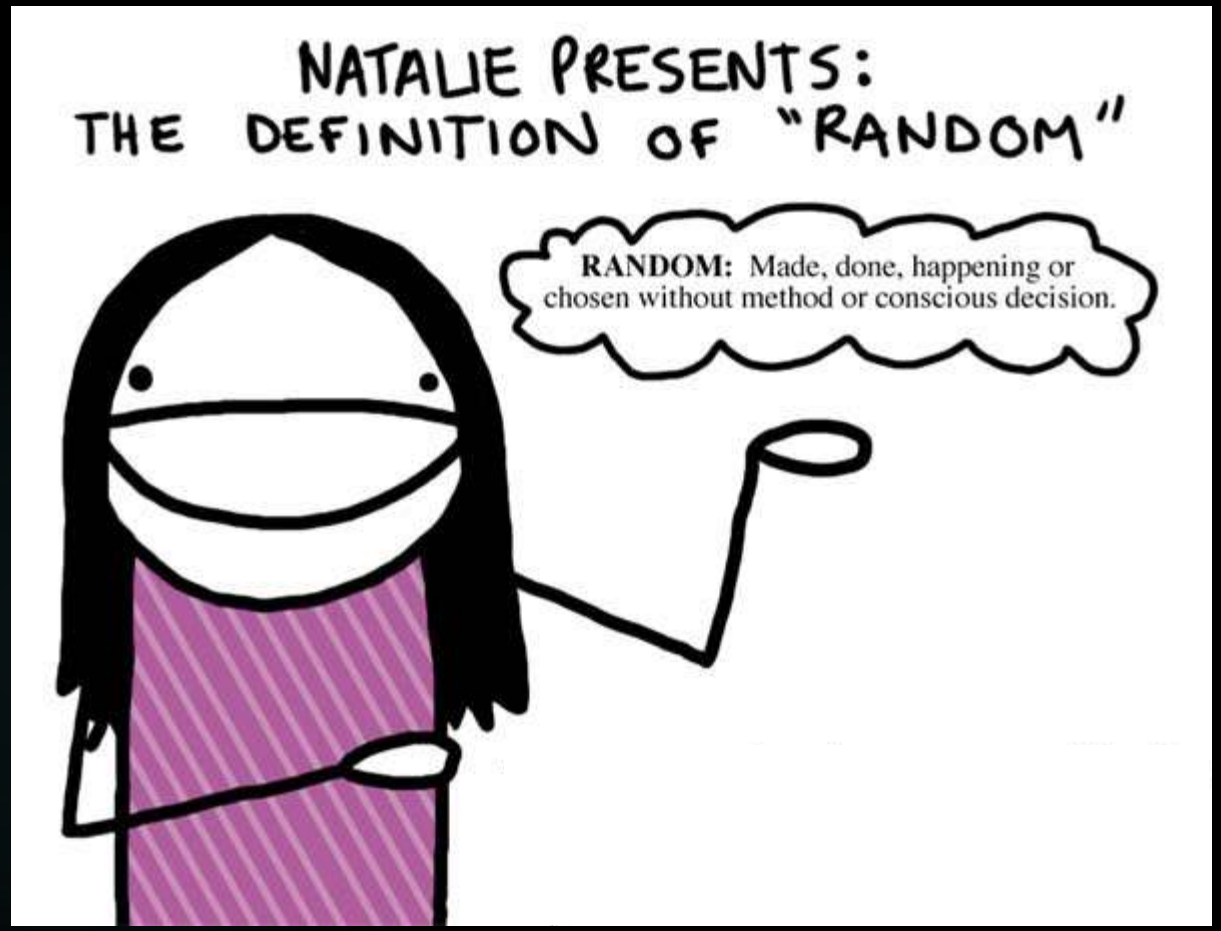
This is the last project

Open Question Time and Non-Random Access

Who is working on team projects?

Get more info from project suggestor

Identify others interested in same 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 are working on an individual project