January 8, 2015

ENGR110/210
Perspectives in Assistive Technology
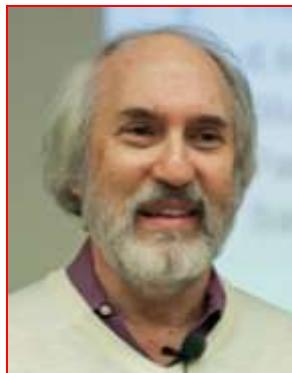
David L. Jaffe, MS

Instructor

Questions?

Happy 80th Birthday, Elvis

Enroll on Axess

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

Today's Handout

For all students:

Important to verify your attendance

- Attendance Sheet

For students taking the course for 3 units: (team projects)

- Project Preference for Students Working on Team Projects

Today's Handout - Project Preference for Students Working on Team Projects

Perspectives in Assistive Technology – Winter 2015
Project Preferences for Students Working on Team Projects (3 credit units)

Student name: _____

For each project 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 its ordinal (1st, 2nd, 3rd, 4th, 5th) ranking.

☺	☹	☺	Indicate Top Five	Project Name
				Music Project for Mrs N
				Horseback Riding at Home Project
				Within Reach Project
				Therapy Game for Stroke Survivors
				Baby Lifter Project
				PDA and Me Project
				Kitchen Helper Project
				Balance Buddy
				Emergency Events
				Hand Cycle Transfer Project
				Educational Design Kit for Children with Disabilities
				Improved Hand Controls Project
				Enhanced Visibility Project
				Orthotics Projects:
				Aesthetic Limb Cover Project
				Knee Extension Assistance for Sports
				Out of Control Wheelchair Project
				Art Tools Project
				Prosthetics Projects:
				Quick disconnect system for lower extremity prosthesis
				Prosthesis sensor notification system
				Prosthetic swim ankle joint
				Project employing the Leap Motion Controller
				Magical Bridge Playground Project
				Guide Robot for the Blind
				Projects for persons recovering from stroke:
				Standing Straight Project
				Activities of Daily Living
				Pimp Out Aubrie's Scooter
				Creative Expression
				Designing Your Afterlife
				Student-defined projects:
				Other project ideas:
				Other:
				Other:
				Other:
				Other:

Enrolled students: please sign this list in **every** class session to confirm your attendance.

ENGR110/210 Enrolled Student Attendance List
January 6, 2015

Email address - @stanford.edu	Name of Enrolled Student	Email address - @stanford.edu	Name of Enrolled Student
	Baena, Joseph		Vartak, Janhavi
	Barbe, Alexander Nelo		von Erb, Alessia
	Becerra, Vincent Joel		Wan, Andrew Wei Chung
	Berschinski, Dan Mason		Wang, Jeanny
	Bui, James Phan		Yeh, Vincent Jan Ying
	Cavalli-Sforza, Manni Luca Giovanni		
	Chin, Erica Ding		
	Deo, Darrel Rohit		
	Dorfman, Doron		
	Grojean III, Thomas Francis		
	Hattom, Marshall Dickens		
	Harris, Jesse Edward		
	Hartwell, Ashley Jessica		
	Hunter-Hill, Jaih Aubrey		
	Janakos, Cassi Nicole		Other students not listed above:
	Johnson, Stuart James		Zhu, Nicole
	Kumar, Sidharth		
	Laydon, John Paul		
	Lorenzo, Alyssa Ivanna		
	Mejia, Esteban Abraham		
	Metlitz, Matt Samuel		
	Nguyen, Kevin Anh		
	Nitta, Susan Uko		
	Pope, Andreas Etienne		
	Powers, Kayla Elise		
	Salazar, Phil James		
	Schoenberg, Alexis Diane		
	Stowers, Amanda Kay		
	Stuart, Zach A		
	Turpin, Autumn Nicole		

Important to verify your attendance at
every class session

Did You Miss Tuesday's Lecture?

- Pick up handouts from Tuesday:
  - Student Team Candidate Projects
  - Enrolled Student Signup Sheet
- Review first lecture video and slides on course website http://engr110.stanford.edu/lecture01a.html
- Email me a 1 – 2 page summary of the lecture, including: What one item did you hear, see, or learn that was new, surprising, interesting, or provided a new perspective?
- Upon receipt of your summary, I will credit you with "attending" this <u>mandatory</u> lecture

Tuesday's Handouts

- Candidate Team Projects
- Mid-tern Team Assignment

Candidate Team Projects

2015 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   4:15pm - 5:30pm
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 desire to work on the same project.

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.

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

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 8th
(Presentation order subject to last minute changes)

Projects pitched by their suggestors:

1. Music Project for Mrs N – Patricia Maxwell
2. Horseback Riding at Home Project - Molly Hale
3. Within Reach Project - June Fisher
4. Therapy Game for Stroke Survivors - Eric Medine
5. Baby Lifter Project - Carol Vernallis
6. PDA and Me Project - Sachiko Berry
7. Kitchen Helper Project & Balance Buddy - Sara Frankel
8. Emergency Events - Anela Bajric
9. Hand Cycle Transfer Project - Patty McTigue
10. Educational Design Kit for Children with Disabilities – Greg Brown
11. Improved Hand Controls Project - Dan Berschinski
12. Enhanced Visibility Project - Fernanda Castelo
13. Orthotics Projects - Max Conserva
14. Out of Control Wheelchair Project - Tony Roide
15. Art Tools Project - Wendy Kuehnl & Roger Young
16. Prosthetics Projects – Gary M. Berke
17. Leap Motion Controller Project - Kate Mitchell & Anthony Lerma
18. *Magical Bridge Playground Project - Olenka Villarreal*
19. Guide Robot for the Blind – Brian Higgins
20. Projects for persons recovering from stroke - Debbie Kenney

Projects pitched by Dave:

21. Pimp Out Aubrie's Scooter - for Aubrie Lee
22. Enhanced access to touch screen devices – for Deane Denney

Dave's suggested projects:

23. Creative Expression
24. Designing Your Afterlife
25. Student-defined projects
26. Other projects

Browse to the Team Projects webpage for project web links:
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
3. work on a project you select as a team of one

Mid-term Team Assignment

ENGR110/210 – Winter 2015
Perspectives in Assistive Technology
Mid-term Team Assignment

This is the mid-term assignment for students working on team projects for three credits.

Overview

For this assignment you are asked to form a team, select a project, contact the individual who suggested the project and interview an individual with a disability or a senior who would benefit from the project to better understand the problem, gather information on existing commercial products and research, determine the magnitude of the need, brainstorm and evaluate potential solutions, select the top three design concepts, begin prototyping solutions, present your progress, and submit a report of your team's progress.

Tasks

For this assignment you are asked to pursue and report on the following tasks.

1. Participate fully in the class including attending lectures as required, listening actively, posing questions to the guest speakers and the course instructor, engaging in class discussions, verbalizing thoughts and analyses, reading and responding to emails from the course instructor, and communicating team project progress.
2. Form a project team of no more than three members. Select a suitable and appropriate name for your team and pick a project leader.
3. Choose a team project from the list of project suggestions. Select a suitable and appropriate name for your project and for the device you will be building. (Your team's name, project selection, project name, device name, and list of members are due by 5pm Friday, January 16th.)
4. Contact the individual(s) listed who suggested the project and get information including details about the problem / need, the disability group(s) targeted, the current solution employed (if any) and its shortcomings or limitations, the potential benefits of an improved solution, and the design features / specifications from his/her point of view.
5. Identify and interview at least one individual who is affected by this problem / need and determine specifically how it affects him / her, the benefits of an improved solution, and the design features / specifications from his / her point of view.
6. Gather information on other solution alternatives including commercially available products, research projects, and previous student projects. Here are some companies that sell assistive technology products or have an online database of devices:
    - Abledata, North Coast Medical, Smith & Nephew, Infogrip, Access Ingenuity, Sammons Preston, Alimed, Allegro Medical, EnableMart, and Therapro.
    - Links to these companies can be found at http://engr110.stanford.edu/assignment1.html
7. Determine the magnitude of the problem/need and identify all the populations who may benefit from an improved solution.
8. Brainstorm possible project solutions and select at least three promising design alternatives. (See Example Spreadsheet for Comparing Design Concepts)
9. Provide a concise and convincing statement of how your project might address the need / problem. Outline general design concepts and new technology that might be brought to bear on it.
10. Begin prototyping solutions starting with sketches, CAD models, and low resolution 3D physical models. Meet regularly with the user to discuss the merits of your developing design - what looks promising and what requires further thought. Refine your prototypes as needed.
11. Present your team's progress (5 minutes, with PowerPoint slides) in class on Thursday, February 12th as described below.
12. Submit a mid-term report as described below.

For next time: In the next assignment your team will asked to choose a specific design concept and fabricate / test a functional prototype. Teams will present their design in class and submit a Final Report and Individual Reflection.

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

Craig Milroy

Director of PRL

Marlo Kohn

Associate Director of PRL

Carly Geehr

Manager of PRL, Room 36

Twenty PRL Teaching Assistants!

Five Minute Overview of Room 36 Resources

Carly Geehr
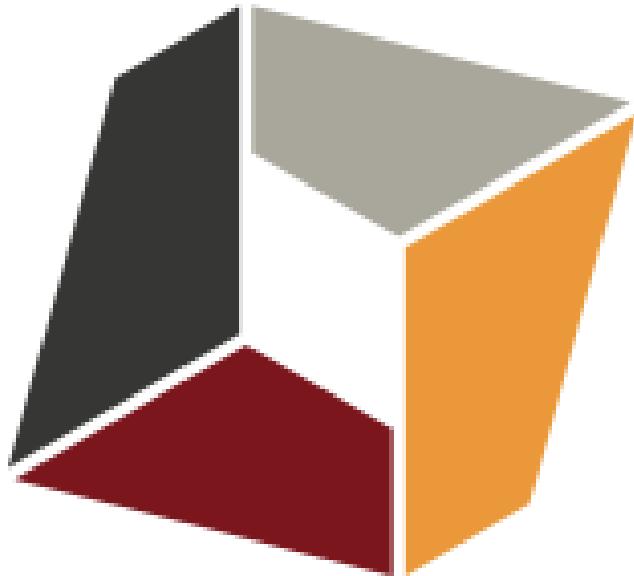
Purpose

Make something!

Get your concepts out into the physical world through hands-on prototyping and exploration.

Room 36 is part of the
Product Realization Lab (PRL)
and is a great on-ramp for rapid prototyping.

Resources – Coaching

Teaching assistants are available during all open hours for design and building coaching.

Room 36 Resources – Tools

- Tools:
  - laser cutters
  - 3D printers
  - electronics prototyping equipment, tools, and supplies
  - band saw
  - scroll saw
  - drill press
  - heat forming tools for plastic
  - vinyl cutter (and heat transfer press for applying vinyl to fabric)
  - sewing machines
  - X-Acto cutting surfaces and tools
  - hand tools such as wrenches, pliers, saws, and drills

Room 36 Resources – Materials

- Materials:
  - foam core
  - cardboard
  - wood
  - plastics
  - fabric
  - foam

- Bins of interesting materials are available for inspiration and use, and additional materials are available for purchase.

- Claim a project bin to store your materials and projects!

Locations
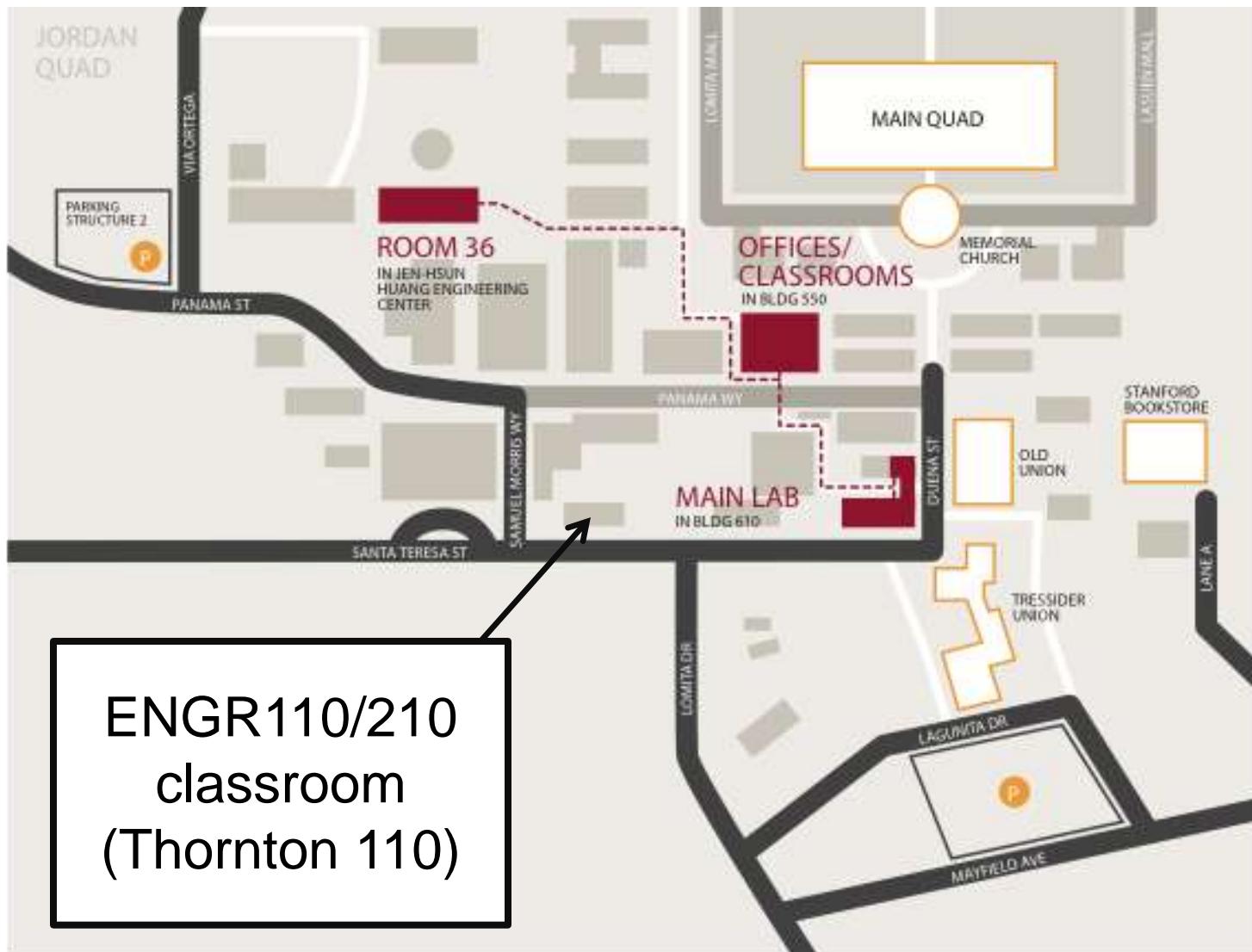
Getting Started

1. **Attend a safety orientation session.**

    - Log on to WebShop (http://webshop.stanford.edu).

    - Safety orientation sessions start at scheduled times and run for 75 mins.

    - Safety sessions meet at the Main Lab in Bldg 610 (on the corner of Santa Teresa and Duena Streets).

    - Please wear closed-toe leather shoes to your scheduled session and arrive a few minutes early to get signed in.

2. **Buy a lab pass.**

    - Buy a lab pass from a TA during an open lab session. The PRL accepts cash and checks made payable to Stanford University.
      2 quarter pass: $80 - 1 quarter pass: $60

3. **Show up!** Come into the PRL to work. The PRL operates on a schedule of 3 daily 4-hour sessions (8am-noon, 1-5pm, 7-11pm). Check the schedule on WebShop to find open sessions in the lab area you'd like to work in.

4. **Talk to a TA about your project.** Come in and talk to a TA during an open session. They are a fantastic resource for you!

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 (no more than teams of 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")

Considerations for Team Formation and Project Selection

Project preference

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

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.

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.

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

Team's engineering skill set

- Match the team's skills and expertise with the project needs.

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 ME210, ME218, and ME310 are very demanding.

Why you may want to Reconsider

If you have enrolled for <u>three units</u>, you may want to consider taking the course for <u>one unit</u> or <u>waiting until next year</u> 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, or
4. If you have to miss lectures or tours
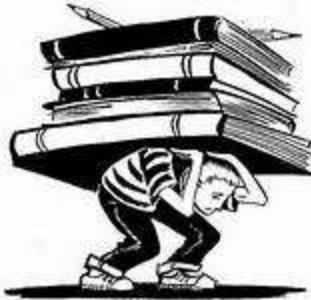
Team Formation Preparedness

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. Work on a project you selected as a team of one

4. Keep an Open Mind!

It pays to keep an open mind, but not so open your brains fall out.
- Carl Sagan
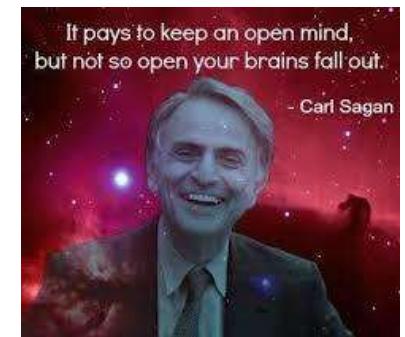
Project Selection & Team Formation

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

– Meet with Dave for suggestions and approval

Project Pitches

- **Music Project for Mrs N** - Patricia Maxwell
- **Horseback Riding at Home Project** - Molly Hale
- **Within Reach Project** - June Fisher
- **Therapy Game for Stroke Survivors** - Eric Medine
- **Baby Lifter Project** - Carol V
- **PDA and Me Project** - Sachiko Berry
- **Kitchen Helper Project & Balance Buddy** - Sara Frankel
- **Emergency Events** - Anela Bajric
- **Hand Cycle Transfer Project** - Patty McTigue
- **Educational Design Kit for Children with Disabilities** - Greg Brown
- **Improved Hand Controls Project** - Dan Berschinski
- **Enhanced Visibility Project** - Fernanda Castelo
- **Orthotics Projects** - Max Conserva
- **Out of Control Wheelchair Project** - Tony Roide
- **Art Tools Project** - Wendy Kuehnl & Roger Young
- **Prosthetics Projects** - Gary M. Berke
- **Project employing the Leap Motion Controller** - Kate Mitchell & Anthony Lerma
- **Magical Bridge Playground Project** - Olenka Villarreal
- **Guide Robot for the Blind** - Brian Higgins
- **Projects for persons recovering from stroke** - Debbie Kenney

Projects Pitched by Dave

- **Pimp Out Aubrie's Scooter** – Dave for Aubrie Lee
- **Enhanced access to touch screen devices** – Dave for Deane Denney

Projects Suggested by Dave

- **Creative Expression**
- **Designing Your Afterlife**
- **Student-defined projects**
- **Other project ideas**

Project Preference for Students Working on Team Projects

Perspectives in Assistive Technology
Project Preferences for Students Working on Team Projects

Student name: _____

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

☹	☺	☺	Indicate Top Five	Project Name
				Music Project for Mrs N
				Horseback Riding at Home Project
				Within Reach Project
				Therapy Game for Stroke Survivors
				Baby Lifter Project
				PDA and Me Project
				Kitchen Helper Project
				Balance Buddy
				Emergency Events
				Hand Cycle Transfer Project
				Educational Design Kit for Children with Disabilities
				Improved Hand Controls Project
				Enhanced Visibility Project
				Orthotics Projects: Aesthetic Limb Cover Project Knee Extension Assistance for Sports
				Out of Control Wheelchair Project
				Art Tools Project
				Prosthetics Projects: Quick disconnect system for lower extremity prosthesis Prosthesis sensor notification system Prosthetic swim ankle joint
				Project employing the Leap Motion Controller
				Magical Bridge Playground Project
				Guide Robot for the Blind
				Projects for persons recovering from stroke: Standing Straight Project Activities of Daily Living
				Pimp Out Aubrie's Scooter
				Creative Expression
				Designing Your Afterlife
				Student-defined projects:
				Other project ideas:
				Other:
				Other:
				Other:
				Other:

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 16th

- Prepare to "hit the ground running"

Project Pitches

Music Project for Mrs N - Patricia Maxwell

- Explore design concepts that would enable Mrs N to independently select, play, and enjoy her favorite music - Beethoven - as this would greatly improve her quality of life.
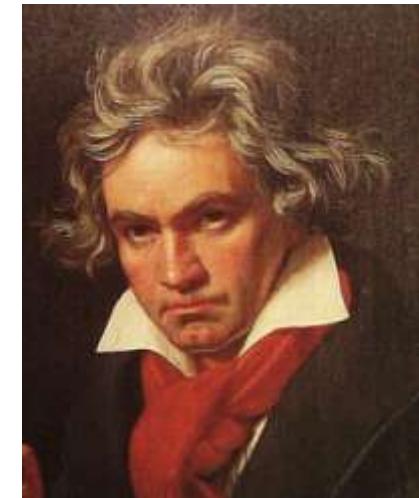
On deck: Molly Hale

Project Pitches

Horseback Riding at Home Project – Molly Hale

- Explore designs for an alternative to horseback riding that would provide similar benefits in a home or clinic environment for people with compromised bodies.

"THERE IS SOMETHING ABOUT THE OUTSIDE OF A HORSE THAT IS GOOD FOR THE INSIDE OF A MAN." ~ WINSTON CHURCHILL

On deck: June Fisher

A Horse for the Living Room

A Horse for the Living Room

Hippotherapy

A Horse for the Living Room

A Horse for the Living Room

Hippotherapy, also known as therapeutic horseback riding, equine-facilitated therapy, or horse therapy, is the passive use of the physical movements of the horse in the treatment of patients with neurological or other disabilities.

Cerebral Palsy, Spinal Cord Injury, Stroke, Parkinson's, Multiple Sclerosis, Autism Spectrum, Post Traumatic Stress, Polio

A Horse for the Living Room

A Horse for the Living Room

A Horse for the Living Room

A Horse for the Living Room
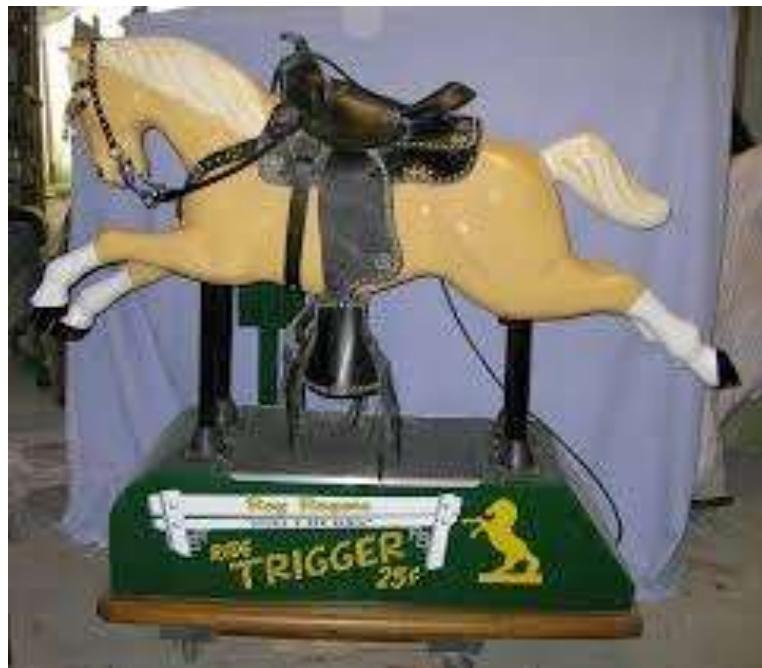
A Horse for the Living Room

Peanut-shaped Physioball

A Horse for the Living Room

A Horse for the Living Room

A Horse for the Living Room

- Creating a stable "horse"
- Easy getting onto and off the surface.
- Ease of straddling the surface.
- Movements mimicking a horse:
  up and down, side to side, back and forth, and diagonal movement.
- Nothing that could cause injury.
- Easy to store the device.

Project Pitches

Within Reach Project - June Fisher

- Explore designs to provide a safe and stable means of accessing items on upper shelves.

On deck: Eric Medine

Within Reach Project

June Fisher, MD
Senior Scientist, Trauma Foundation
Founder and Director, TDICT Project

Contact:
tdictproj@aol.com
415/641-4163

Within Reach Project

Problem:

- I cannot reach most shelves in kitchen or shelves in closets

- With aging and decreased mobility, I find that my current step stools are not safe

Within Reach Project

What I have now:

Within Reach Project

Typical recommended stool for older adults:

Within Reach Project

What would make me feel secure:

- Bilateral banisters
- Wheels that are stationary when weight is applied
- Steps are not high
- Highest step is a platform

Within Reach Project

Two rail stool:

- Too wide
- Top step too narrow
- Not folding
- Has wheels that retract
- Too expensive – over $600

Within Reach Project

Ideal Step Stool:

- Bilateral handrails
- Handrails not too far apart
- Two steps:
  - Steps not too high
  - Platforms are wide and deep
- Employs wheels that retract when stepped on
- Folds for storage
- Attractive in appearance
- Affordable

Project Pitches

Therapy Game for Stroke Survivors - Eric Medine

- Explore game designs that that employ a motion-sensing interface to create a compelling range-of-motion exercise game, with a goal of increasing patient participation and therapy compliance.

On deck: Carol V

Therapy Game for Stroke Survivors

Eric Medine

Therapy Game for Stroke Survivors

Standard Exercises for Stroke
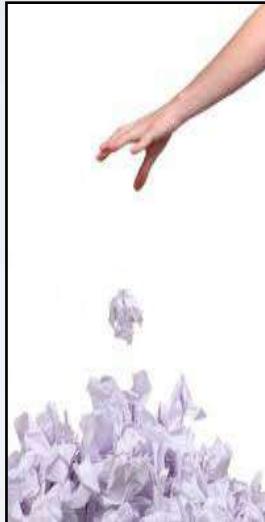
"Crumple" exercise for hand
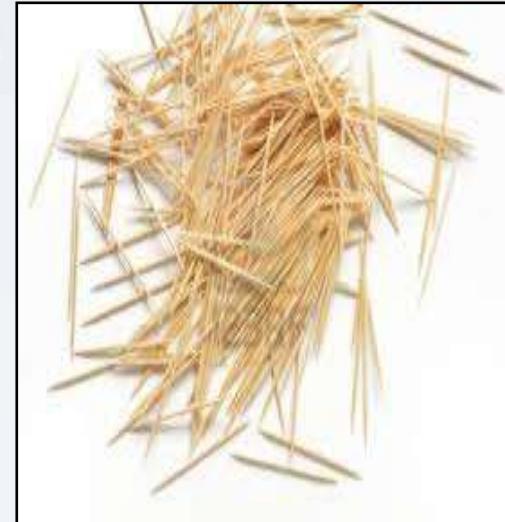
"Pinch" exercise for fingers

Therapy Game for Stroke Survivors

Gameplay Exercises for Stroke
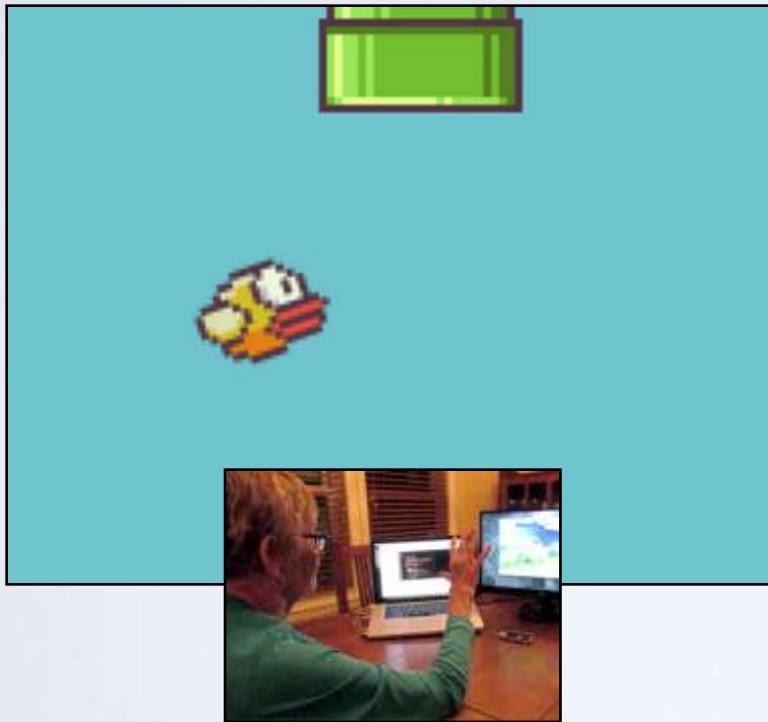
"Grab" exercise for hand

"Pinch" exercise for fingers

Therapy Game for Stroke Survivors

Design Criteria

- Motion-sensing

- Use at home

- Can be customized to individual's mobility / goals

- Record user progress ("patient dashboard")

Therapy Game for Stroke Survivors

User Criteria

- Limited hand or arm mobility

- Normal mobility in their shoulder and arm

- Ability to follow written / verbal instructions

- Access to a computer (ideally internet-connected)

Therapy Game for Stroke Survivors

More Information

Visual Touch Therapy
http://www.visualtouchtherapy.com

Correlates of exercise compliance in physical therapy
http://www.ncbi.nlm.nih.gov/pubmed/8234458

Kinect Physical Therapy - Boat Driving
http://x-tech.am/kinect-physical-therapy-boat-driving/

Contact Information:
Eric Medine
info@visualtouchtherapy.com
emedine@gmail.com
310/923-8164

Project Pitches

Baby Lifter Project - Carol V

- Explore design concepts addressing one or more of Carol's activities as a mother.

On deck: Sachiko Berry

Baby Lifter Inspired by Bea

A Project to Help Disabled Caretakers of Children

Baby Products › Nursery › Furniture › Cribs & Nursery Beds › Cribs

Click to open expanded view

VIDEO

Dream On Me Electronic Wonder Crib II, Espresso

by Dream On Me

★★★★☆ ▾   8 customer reviews

List Price: ~~$939.99~~
Price: **$628.83** & **FREE Shipping.** FREE Returns. Details
You Save: $311.16 (33%)

Only 1 left in stock.
Ships from and sold by Amazon.com.

Color: **Espresso**

$549.98	$549.98	$628.83	$549.98

$548.99

- Converts to a toddler day bed and full size bed (toddler bedrails and mattress sold separately)
- Wonder Crib uses a 12 volt converter and safely plugs into any 110 outlet
- Mattress height can be moved electronically to any desired height with your child safely in the crib
- Changing sheets is made easy and effortless
- ASTM and CPSC Certified

› See more product details

› 3 new from $628.83

This item's packaging will be visible when delivered and cannot be gift-wrapped.

Share ✉ f �facebook ✔ 🅿

Scheduled delivery
Delivery will be scheduled during checkout. Signature required.

🛒 Add to Cart

1-Click ordering is not available for this item.

Add to Wish List

Add to Baby Registry

Other Sellers on Amazon

$850.84   Add to Cart
+ $78.99 shipping
Sold by: Portlight

3 new from $628.83

Have one to sell?   Sell on Amazon

http://www.amazon.com/gp/product/B000EJCW8U/ref=oh_aui_search_detailpage?ie=UTF8&psc=1

http://www.liberty-terminals.com/upload/heavy_lifts_516.jpg

http://www.diamondedgeltd.com/acatalog/Aeolus%20FT806%20Electric%20dog%20grooming%20table.jpg

http://rhetoricalpens.files.wordpress.com/2012/04/hepworth-mother-and-child-1000px.jpg

standard chair

base of chair for baby

http://www.diamondedgeltd.com/acatalog/Aeolus%20FT806%20Electric%20dog%20grooming%20table.jpg

http://www.sculpturegallery.com/sixteen/mother_and_child.jpg

Project Pitches

PDA and Me Project - Sachiko Berry

- Explore designs that would enable Sachiko to handle and operate an iPhone or iPad with one hand.

On deck: Sara Frankel

Project Pitches

Kitchen Helper Project - Sara Frankel

- Explore designs to help individuals with weakness in their hands or arms with kitchen activities such as food preparation and food service.

Balance Buddy - Sara Frankel

- Explore design concepts for an easily managed device to help older adults who are having balance problems in their homes.

On deck: Anela Bajric

Project Pitches

Emergency Events - Anela Bajric

- Explore design concepts that address the protection, detection, and evacuation of people with disabilities and older adults prior to, during, and subsequent to an emergency event such as an earthquake, power outage, fire, or flood.

On deck: Patty McTigue

Civil engineering design with people with disabilities in mind

Assistive technologies for evacuation during earthquakes

"I know of deaf people who have died because they never heard an audible carbon monoxide alarm. There is a need for housing that makes considerations for people with hearing loss."

- Lise Hamlin, director of public policy for the Hearing Loss Association of America

Emergency Events

Project Pitch
January 8, 2015

Anela Bajrić, Msc
PhD Student
Section for Structural Engineering
abaj@byg.dtu.dk

Department of Civil Engineering

Individuals with disabilities are subject to an increased risk during and after an emergency event due to their diminished mobility and sensory capabilities.

e.g. "In case of emergency, do not use elevators, use stairways!"
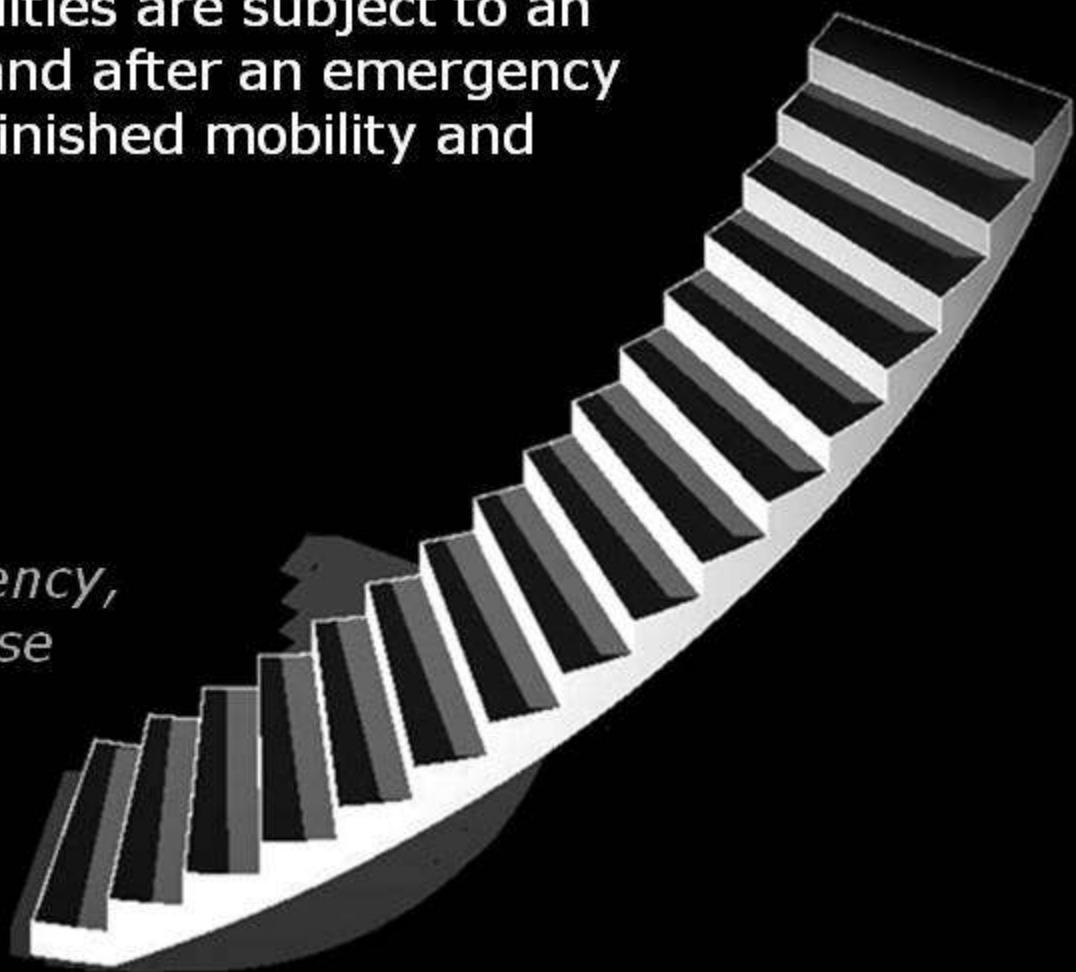
During an Emergency Event

Warn building occupants
- communciate structure-specific warning(s)
- within building - sound and light alarms
- include expected severity info and emergency instructions

EXIT

Post Emergency Event

Evacuation solutions for people with disabilities:
* - mobility-impaired*
* - visually-impaired*
* - hearing-impaired*

EXIT

Project

Explore design concepts to facilitate the
protection, detection, and evacuation of
people with disabilities during and
subsequent to an emergency event
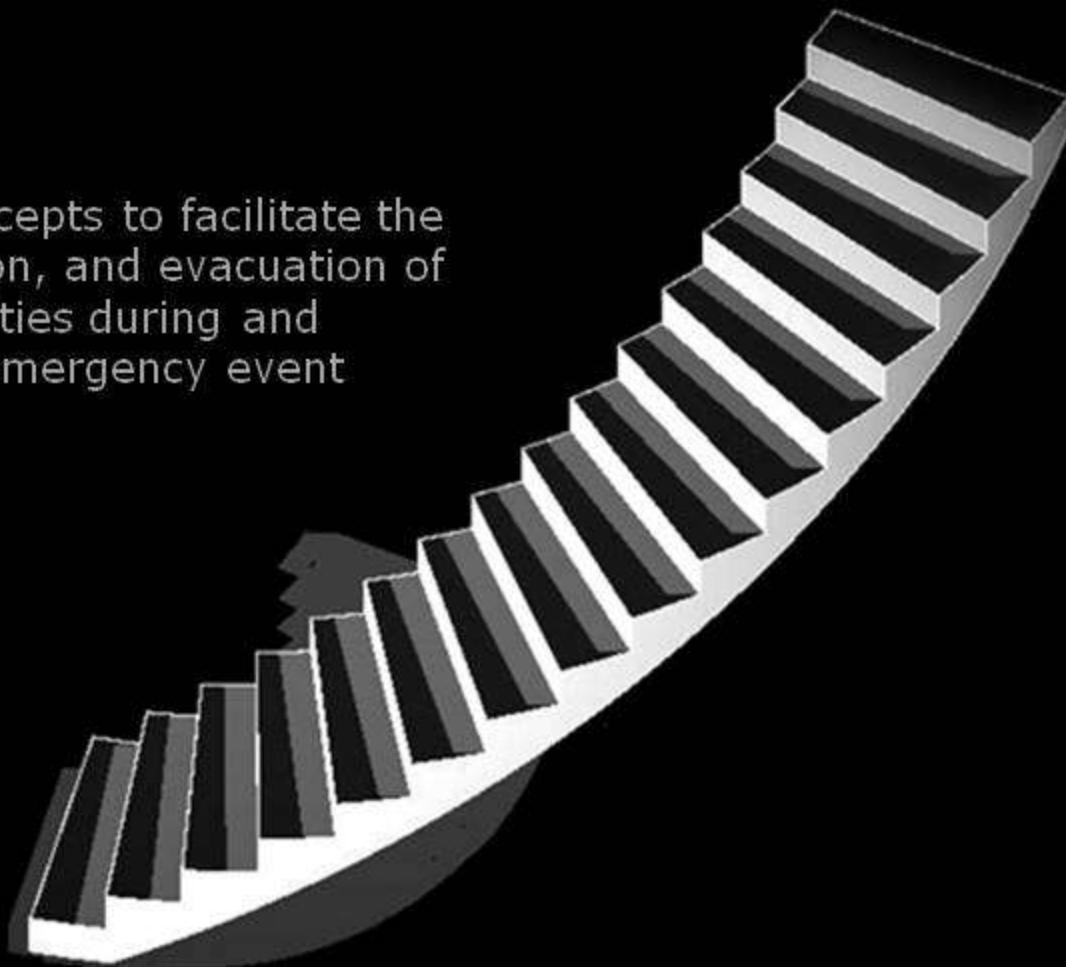
Project Outcome

- Warning systems with indicators appropriate for individuals with sensory impairments

- Detection and evacuation systems for individuals with mobility impairments
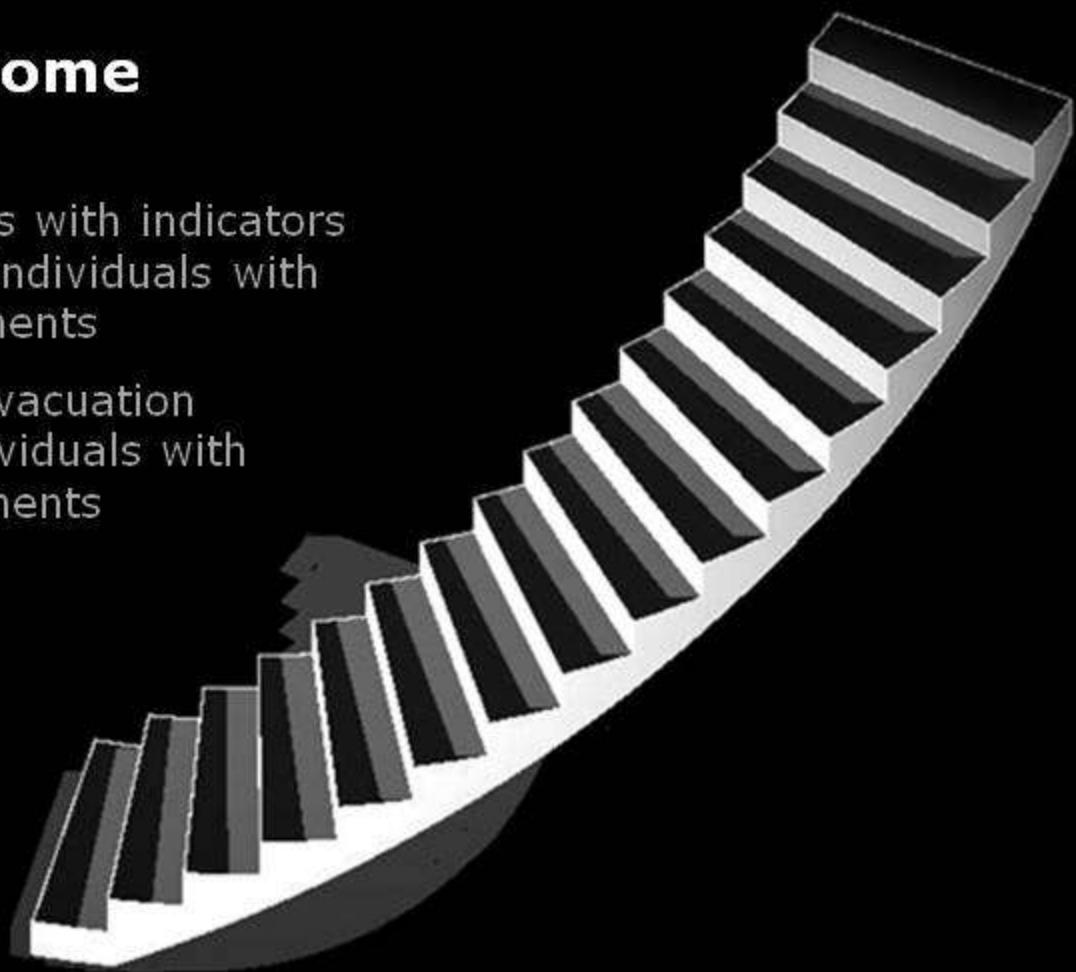
Are you interested in developing design concepts for safe egress of people with disabilities?

EXIT

Links

- Earthquake Country Alliance
  http://earthquakecountry.org/disability/

- People with Special Needs – Earthquakes
  http://www.bt.cdc.gov/disasters/earthquakes/disabilities.asp

- Earthquake Safety for the Disabled & the Elderly
  http://www.odpem.org.jm/DisastersDoHappen/TypesofHazardsDisasters/Earthquakes/ProtectYour
  selfFromanEarthquake/EarthquakeSafetyfortheDisabledtheElderly/tabid/263/Default.aspx

- Emergency Evacuation Planning Guide for People with Disabilities
  http://www.oklahoma.feb.gov/Forms/EvacuationGuideNFPA.pdf

- Emergency Evacuation for People with Disabilities
  http://blink.ucsd.edu/safety/emergencies/preparedness/get-ready/disabilities.html

- Employers' Guide to Including Employees with Disabilities in Emergency Evacuation Plans
  http://askjan.org/media/emergency.html

- Emergency Evacuation Procedures for Persons with Disabilities
  http://safety.uchicago.edu/pp/emergency/evac_procedures.shtml

Project Pitches

Hand Cycle Transfer Project - Patty McTigue

- Explore designs that would help a hand cyclist with quadriplegia independently transfer to and from his/her wheelchair to an Invacare Top End Force-3 hand cycle.

On deck: Greg Brown

Hand Cycle Transfer Project

Patty McTigue – BORP Volunteer

Bay Area Outreach & Recreation Program (BORP)

Adaptive Cycling Center in Berkeley, CA

Director - Greg Milano

Hand Cycle Transfer Project

- Explore Designs that would help a hand cyclist with quadriplegia independently transfer to and from his/her wheelchair to an Invacare Top Force-3 hand cycle.

Hand Cycle Transfer Project

- Current Transfer methods include
  - Utilizing other people to lift and transfer the cyclist
  - Utilizing an adaptive lift made for entering a swimming pool
- Neither of these solutions allow the cyclist to independently utilize his cycle at home

Hand Cycle Transfer Project

- Proposed Prototype
  - ~~Develop a prototype that allows the seat of the adaptive cycle to raise and lower~~
  - ~~Be able to raise/lower with the cyclist's weight on the seat~~
  - Be able to be used independently by the cyclist

Project Pitches

Educational Design Kit for Children with Disabilities - Greg Brown

- Explore ideas for an Educational Design Kit that will engage children (grades 3 to 8) including those with moderate sight, mobility, or dexterity limitations and evaluate their effectiveness in a classroom setting.

On deck: Dan Berschinski

Inspiring Hands-On Learning

To spark the love of learning for the next generation of thinkers, problem solvers, innovators, and creators

Starting with a big bag of
surplus materials ….

Create an **Educational Design Kit** for children with disabilities!

Toy

Science

Game

… ???

http://www.raft.net

greg@raft.net

Project Pitches

Improved Hand Controls Project - Dan Berschinski

• Explore hand control designs that would combine the best features of Dan's hand controls.

On deck: Fernanda Castelo

Improved Hand Controls Project

Two types of hand controls:

Permanent

Improved Hand Controls Project

Improved Hand Controls Project

Two types of hand controls:

Permanent

Improved Hand Controls Project

The Problem

Improved Hand Controls Project

Improved Hand Controls Project

Improved Hand Controls Project

- Dan Berschinski
- GSB '15
- DanBer@Stanford.edu

Project Pitches

Enhanced Visibility Project - Fernanda Castelo

- Explore designs that will enhance the night time visibility and safety of the WHILL.

- Video 2:36

On deck: Max Conserva

Project Pitches

Orthotics Projects - Max Conserva

Aesthetic Limb Cover Project
- Explore cover designs that address superficial deficiencies in my right leg - specifically the lack of girth, the abnormal angle, and the abnormal shape - essentially hiding the disfigurement. The limb covering itself can be noticeable, but not the underlying disfigurement.

Knee Extension Assistance for Sports
- Explore designs for a knee extension assist mechanism that will attach to an existing knee brace for use in heavy sports activities such as snowboarding, Olympic weightlifting, cycling, running, and jumping.

On deck: Tony Roide

Orthotics Projects
Orthotics & Me
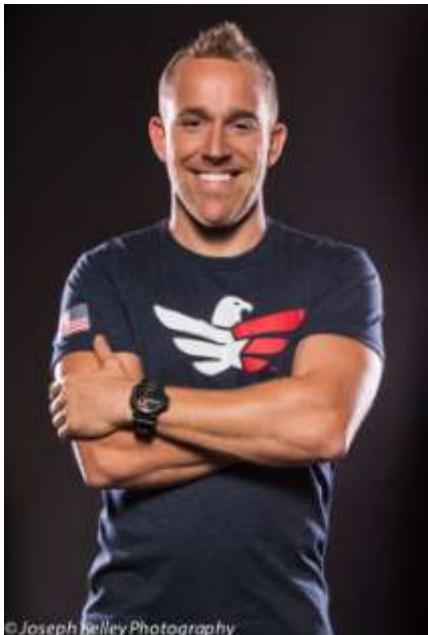
Orthotics Projects
Aesthetic Limb Cover

- Aim: Restoring anatomical appearance

- Skills: Industrial Design, Materials

Orthotics Projects
Knee Extension Assist

- Aim: Provide knee extension assistance to a mono-plane joint

- Utilize normal motion for energy storage and return

- Skills: Mechanical, Materials, Biomechanical

Orthotics Projects
Why Work with Me?

- I'm an engineer

- I'm motivated

- I'm available

Project Pitches

Out of Control Wheelchair Project - Tony Roide

- Explore a dual design solution that both addresses the limitations of current harnesses (including lack of aesthetic appeal, difficulty to put on, and movement restrictions), and detects and reports dangerous events.

On deck: Wendy Kuehnl & Roger Young

"This is our best model, the Cougar 9000. It's the Rolls-Royce of wheelchairs. This is like ... you're almost glad to be handicapped."

The Connected Wheelchair Project
ENGR110

Tony Roide
Internet of Things Group
Platform & Software Validation

8 Jan 2015

intel

Meet Pete

Connected Wheelchair Project

Project Pitches

Art Tools Project - Wendy Kuehnl & Roger Young

- Explore designs that would allow artists with developmental and physical disabilities to be more independent and increase their ability to participate in art.

On deck: Gary M. Berke

Art Tools Project

Art Tools for Adults with
Developmental Disabilities

- Age Appropriate (for adults)
- Choice Centered
- Multi-sensory
- Motivational (to encourage user to go to the next step)
- Purpose Driven
- Reward / Award Possibilities (competitions)
- Graduated Skill Levels

Project Pitches

Prosthetics Projects - Gary M. Berke, MS CP

Quick disconnect system for lower extremity prosthesis
- Explore design for a quick disconnect device that is strong, very thin, and applicable to various types of prosthetic devices such that the components of a prosthesis can be removed or detached for more comfortable sitting without having to actually take the entire prosthesis off.

Prosthesis sensor notification system
- 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 a sock.

Prosthetic swim ankle joint
- Explore simple, strong, waterproof, and lightweight designs that allow a prosthetic foot to convert easily from a normal walking position to one that is suitable for swimming (full plantar-flexed position).

On deck: Kate Mitchell & Anthony Lerma

Project 1
Quick Disconnect

- Lightweight
- Easy to use
- Maintains component relationships
- Strong

Project 2
Pressure Sensor and Notification System
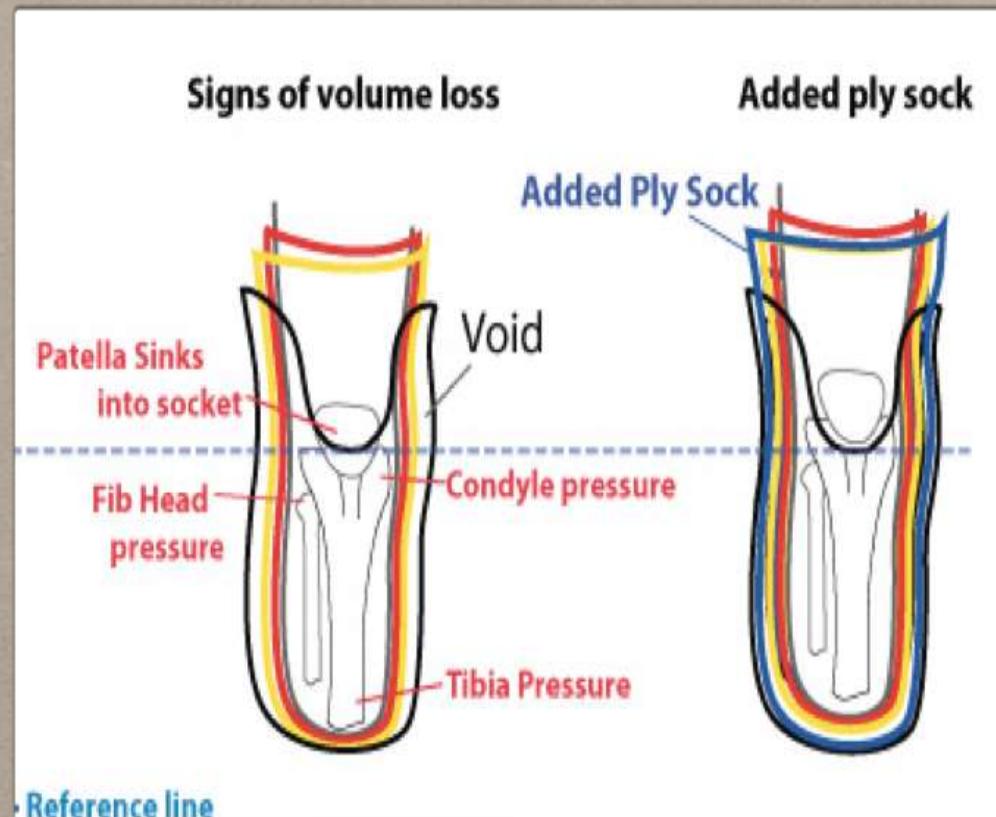
- *Non-intrusive*
- *Durable*
- *Reliable*

Project 3
Swim Foot

- *Durable*
- *Salt water tolerant*
- *Light weight*

Project Pitches

Project Employing the Leap Motion Controller - Kate Mitchell & Anthony Lerma

- Explore an application for a person with a disability using the Leap Motion Controller product.

On deck: Olenka Villarreal

Introduction

Kate Mitchell

Social Media & Content

kmitchell@leapmotion.com

Anthony Lerma

Developer Programs

anthony@leapmotion.com

Overview

- What is the Leap Motion Controller?
- Hardware Breakdown
- Software Architecture & Components
- Software Development Kit
- v2 Tracking Data
- Development Tips

Hardware Breakdown

- ## Near Infrared LEDs
  - Illuminate hands in day or night

- ## Wide Angle Lenses
- Provide large interaction space

- ## Global Shutter Image Sensors
- Capture a true instant in time

- ## USB Controller
- Crops & compresses video streams
- USB 2.0 or 3.0 data transfer speeds

Software Development Kit

Native Development

- Windows, Mac & Linux

- C++, C# (Unity 3D), Objective-C, Java & Python

- Extensible to other languages (e.g., Flash/AIR, MatLab, Ruby)

- Polling or event callbacks

- SDK, libraries, documentation, tutorials & examples available from developer.leapmotion.com

- Unity starter kit and examples from bit.ly/LeapUnityAssets

Web Development

- Support for modern browsers through WebSocket connection

- JavaScript & CoffeeScript

- Plugin system to share common code & reduce boilerplate

- Polling or event callbacks

- LeapJS library, documentation, tutorials & examples available from js.leapmotion.com

- Libraries hosted on our CDN

API Tracking Data Available in v2 Beta

- Hands

  - Handedness (left or right)

  - Arm (length, width, direction, basis, wrist & elbow positions)

  - Tracking confidence

  - Grab strength

  - Pinch strength

- Fingers

- Persistence (always 5 fingers)

- Extended or retracted

- Digit type identification (thumb, index, middle, ring, pinky)

- Bones (length, width, direction, basis, near & far joint positions)

Grab   Pinch   Joint Positions

Leap in the Wild

LEAP
MOTION

Healthcare
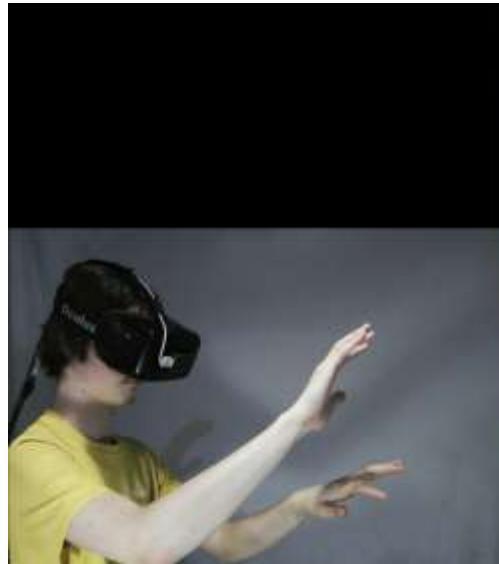
Education
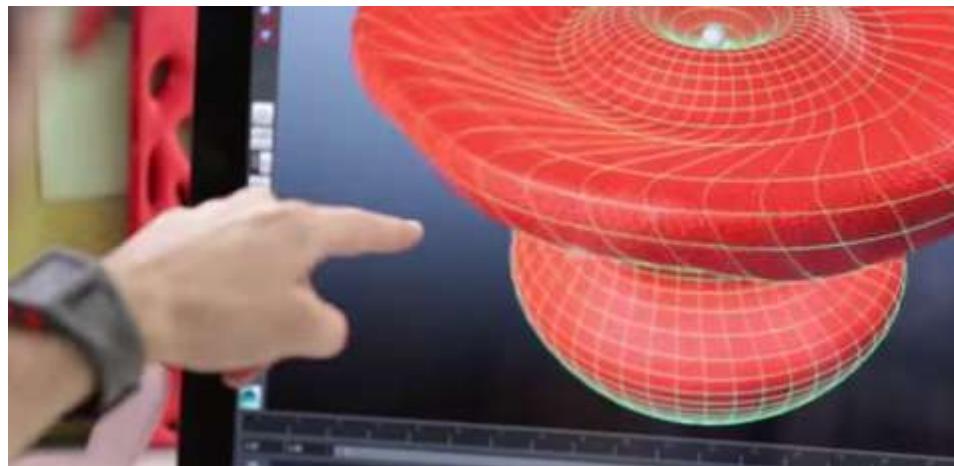
Design

Development Tips

- Device location & orientation
  - Consider hand ergonomics
  - Make sweet spot accessible
  - Test environmental lighting

- Motion control vs. gestures
  - Immediate vs. delayed result
  - Direct object manipulation vs. abstract state control

- User experience
  - Orient user with tutorials
  - Provide visual feedback

- Menu interaction
  - Throw away 2D assumptions (clicks)
  - Use boundary-crossing or hover
  - Integrate menus with content

- Development process
  - Observe interaction styles in other motion-controlled applications
  - Focus on core interactions
  - Make rapid prototypes
  - Test with users and iterate

Thank You

developer.leapmotion.com

developers@leapmotion.com

@LeapMotionDev

Project Pitches

Magical Bridge Playground Project - Olenka Villarreal

- Explore designs to address the following four issues, creating a safe, fun, accessible, and inclusive park serving all children and their parents.

On deck: Brian Higgins

Perspectives in Assistive Technology, Winter Quarter 2015
Project Pitch

Presented by Olenka Villarreal

Founder (and Inclusive-Play Enthusiast)

"Accessible" Just Isn't Enough

- Not a single public playground has been designed with everyone's unique play needs in mind.

- Private funds have been raised, and groundbreaking occurred June 2014 with completion scheduled mid-February 2015.

- Let's start a national conversation! Community parks must serve the many kinds of people who live in the community.

- ADA-standards are not meeting the needs of many living with a disability.

- The Magical Bridge promises to be the nation's most innovative inclusive playground and is right here, in Palo Alto.

7 Unique Play Zones

Current Play Zone Pilasters

INFORMATIONAL SIGN SAMPLE

1. SWINGS
PLAY TYPE: XXXX
INNOVATIONS: XXXX

2. ROLLER TABLE
PLAY TYPE: XXXX
INNOVATIONS: XXXX

3. DISK SWINGS
PLAY TYPE: XXXX
INNOVATIONS: XXXX

4. SWAY BOAT
PLAY TYPE: XXXX
INNOVATIONS: XXXX

INFORMATIONAL SIGN

BRAIL NAME OF ZONE

QR CODE

SWING ZONE BY THE ENLIGHT FOUNDATION
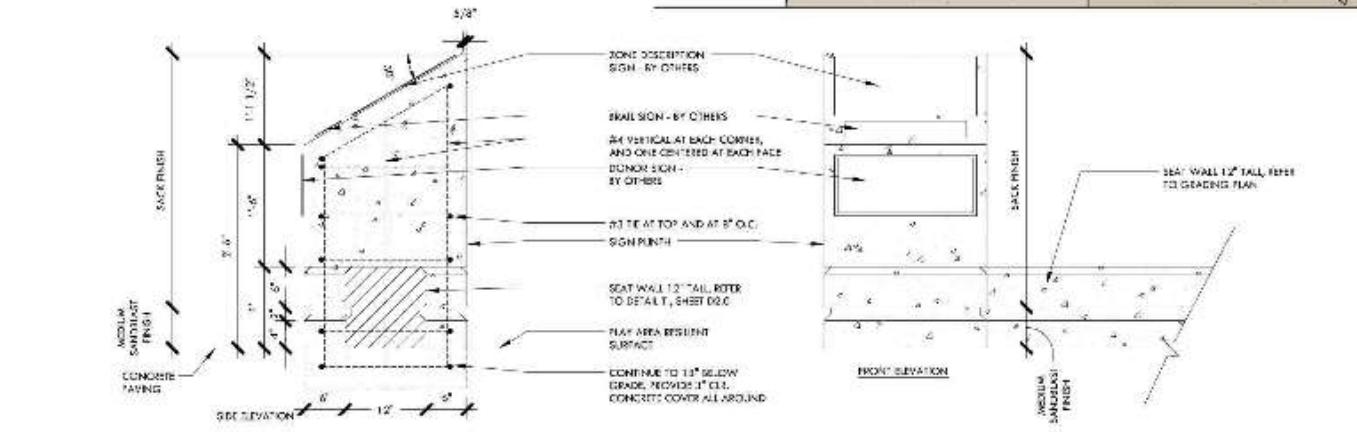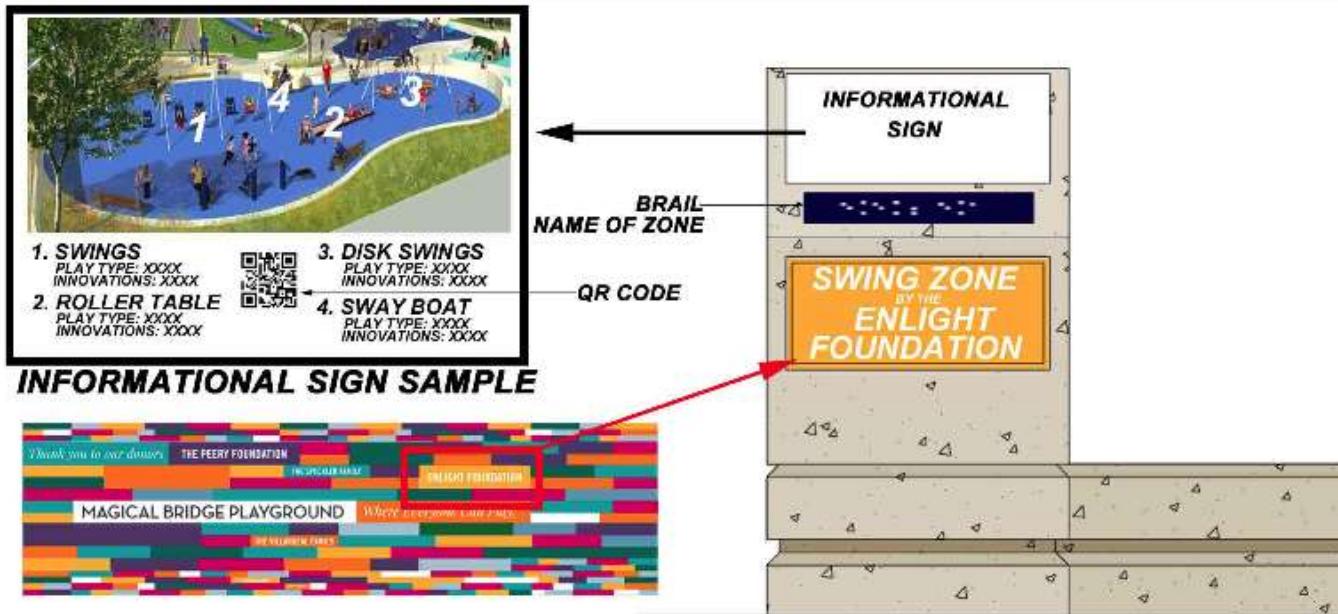
A Magical Opportunity

- Enhance signage for playground users who are visually or hearing impaired, while addressing the needs of sensory visitors.

- A tactile sign which provides an overview of the playground is needed for the Entry Plaza.

ADA CHECKLIST
View Online Checklist

FUN FOR ALL

Be Part of the Magic - Join Us!

www.magicalbridge.org
olenka@magicalbridge.org
650/380-1557

Project Pitches

Guide Robot for the Blind - Brian Higgins

- Build a user-interface that facilitates the communication between the robot and the user as well as the platform that supports the motorized computerized robot device.

On deck: Debbie Kenney

Project Pitches

Projects for persons recovering from stroke - Debbie Kenney

Standing Straight Project

- Explore designs for a dynamic device that would aid the person to realize their true center resulting in better limb rehabilitation.

Activities of Daily Living

- Explore designs for devices that would help persons who have had a stroke, who have arthritis, cerebral palsy, have limited arm or hand strength, or are amputees to perform activities of daily living such as cooking, cleaning, or other common household tasks.

On deck: Dave for Aubrie Lee

Projects for persons recovering from stroke

Stand / Sit Straight Project
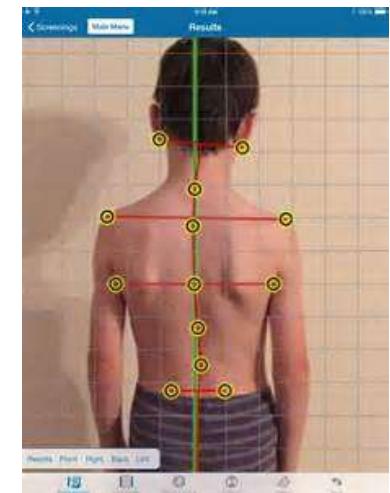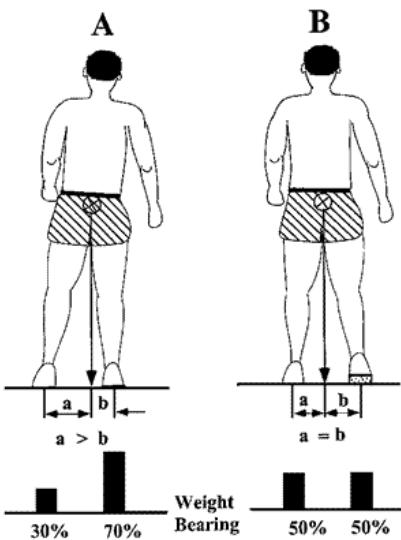
Projects for persons recovering from stroke

One Handed Adaptive Aids

- Cane holder that can attach to movie theater seating, recliners, etc .

- School lunch tray holder

- Tray or plate holder for people with hemiplegia and using a cane

- Milk carton opener for young children

- Book page holder / Portable book holder

- Tool to help engage separating zipper (jacket zipper) to engage and hold box and pin

- One handed sock or compression garment donning aid for someone who can't bend their leg

- Umbrella holder for cane or walker user

- Hair shampoo aid

Project Pitches

Pimp Out Aubrie's Scooter - Dave for Aubrie Lee

- Explore ways to add a personal aesthetic to Aubrie's scooter

On deck: Dave for Deane Denney

This is Aubrie

Aubrie is a 2014 Stanford Product Design graduate
who now works at Google.

Mood board

"Examples of aesthetics I like. Possible inspiration for any modifications"
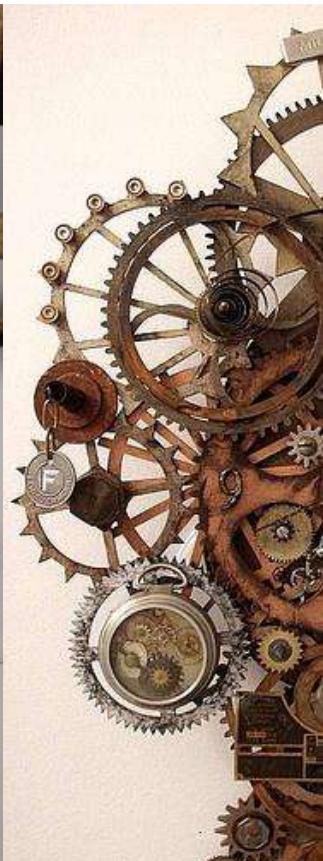
Requirements

Your team:

● Must be able to come to Google

Modifications:

● Must not restrict driving controls
● Must be undoable / removable

Project Pitches

Enhanced access to touch screen devices – 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.

On deck: Dave

Project Pitches

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.

Photos Tim Smith

Project Pitches

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.

Project Pitches

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

Project Pitches

Other project ideas

- Household Tasks
- Shower / Bathtub / Sink / Toilet / Cleaning Project
- Pooper scooper for canine companions of wheelchair users
- Projects no longer supported by a suggestor

Short Break

Break Activities

- Stand up and stretch
- Take a bio-break
- Text message
- Web-surf
- Respond to email
- Talk with classmates
- Reflect on what was presented in class
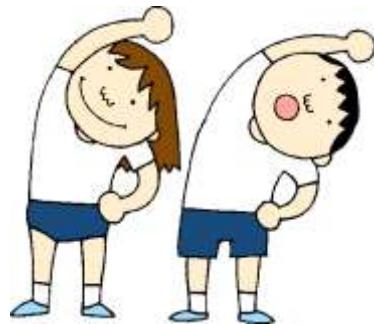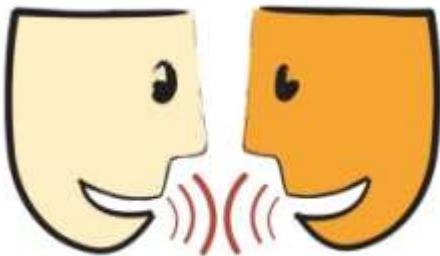
Tuesday, Jan 13th
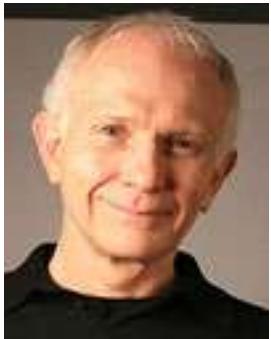
Gayle Curtis - UX Design Consultant

Need Finding and Context Discovery for Assistive Technologies

Open Question Time
and Non-Random Access

Who is working on team projects?

What are your top choices?

NATALIE PRESENTS:
THE DEFINITION OF "RANDOM"

RANDOM: Made, done, happening or chosen without method or conscious decision.

Get more info from project suggestor

Question Time?

Identify others interested in same projects

Have course questions? Ask Dave

See Dave if you are working on an individual project

Class Dismissed