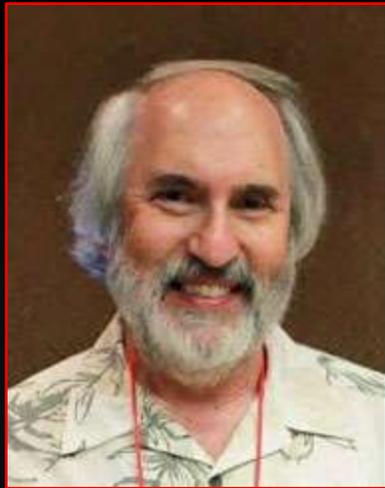


January 24, 2017



ENGR110/210

Perspectives in Assistive Technology



David L. Jaffe, MS
Instructor



Questions?



Attendance Sheet, Evaluation Form, and Meet with Dave Signup



For all students:

- Attendance Sheet
- Meet with Dave signup – Teams or individual students

For everyone:

- Class Session Evaluation Form



ENGR110210 Enrolled Student Attendance List
January 10, 2017

Enroll Number	Name of Enrolled Student	Enroll Number	Name of Enrolled Student
1001	John Adams	1002	Jane Doe
1003	Mike Smith	1004	Emily White
1005	David Brown	1006	Robert Green
1007	Michelle Black	1008	Christopher Grey
1009	Stephanie Pink	1010	Matthew Blue
1011	Andrew Yellow	1012	Sarah Purple
1013	Kevin Orange	1014	Nathan Red
1015	Olivia Silver	1016	Isaac Gold
1017	Lucas Bronze	1018	Chloe Iron
1019	Benjamin Steel	1020	Madison Copper
1021	Samuel Tin	1022	Abigail Nickel
1023	Jonathan Zinc	1024	Madeline Cadmium
1025	Michael Lead		
1027	William Mercury		
1029	James Silver		
1031	Robert Gold		
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1103	Kevin Cadmium		
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1107	Lucas Gold		
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1793	Kevin Cadmium		
179			

Pre-lecture Discussion Topics



- 19 Assistive Robotics
- 19 In the News
- 14 Ten Commandments of Making
- 14 Video Theatre
- 11 Marketing terms
- 9 Ethical / Moral Dilemmas Related to Disability
- 9 Vintage Assistive Technology
- 7 Who is Disabled?
- 7 More on the Design Development Process
- 7 Famous people with disabilities - TV Edition
- 3 The Upside of Failure
- 1 Assistive Robotics for Medical Devices



Team Projects

- ▶ Shop passes
- ▶ Report team project progress
- ▶ Meet with Dave



Rules of Brainstorming

1. Start with a full understanding of the problem
2. Defer judgment
3. Encourage wild ideas
4. Build on the ideas of others
5. Stay focused on the topic
6. One conversation at a time
7. Be visual
8. Go for quantity



The seven rules of brainstorming - Ideo



Understand the Problem

- ▶ Clarify goals and objectives
 - ▶ Incorporate users' perspectives and standards of care

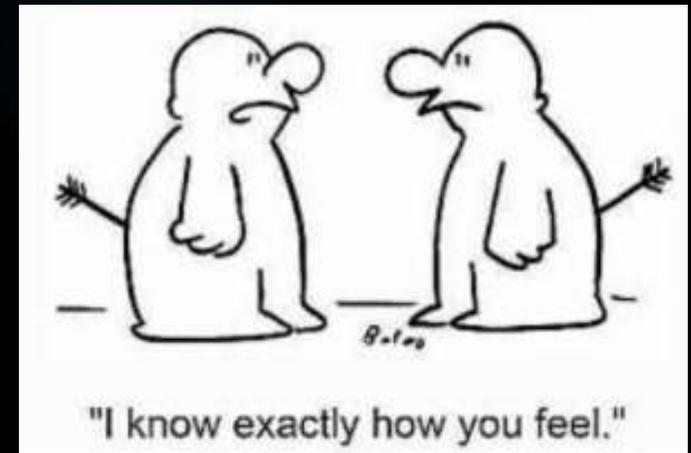


- ▶ Gather information
 - ▶ WWW, library, journals (research)
 - ▶ Product catalogs (existing products)
 - ▶ Stakeholders
 - ▶ Experts & health care professionals



Understand the Problem

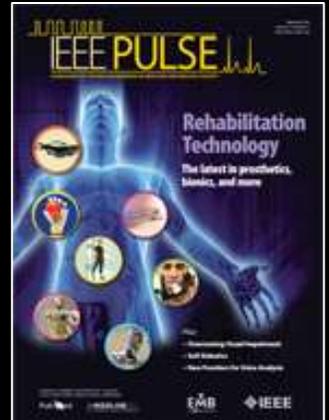
- ▶ Often called “Empathy”
- ▶ Find out as much as you can
- ▶ User’s specific background and situation
- ▶ Review information on the disability condition
- ▶ Solicit the perspectives of people with disabilities and older adults, family members, friends, health care professionals, colleagues, researchers, engineers, product suppliers
- ▶ Query professionals via online listservs



Understand the Problem

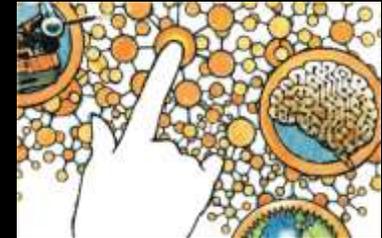


- ▶ Research current solutions
 - ▶ Published research
 - ▶ Articles in popular media
 - ▶ Previous student projects
 - ▶ Product catalogs



Understand the Problem

- ▶ *“While a user may have a good handle on The Problem, he/she may not fully appreciate the benefits and limitations of technology.” Dave*
- ▶ *“Since each person has his/her own circumstances, desires, and sense of aesthetics, a solution for one user may not be applicable for the entire population.” Dave*



Understand the Problem

Research current solutions

- ▶ What products currently address the problem?
- ▶ What products are commonly used?
- ▶ What is considered the standard of care?
- ▶ You may not want to reinvent what already exists or has already been tried

“Sometimes the only problem is a lack of awareness of a suitable existing solution.” Dave



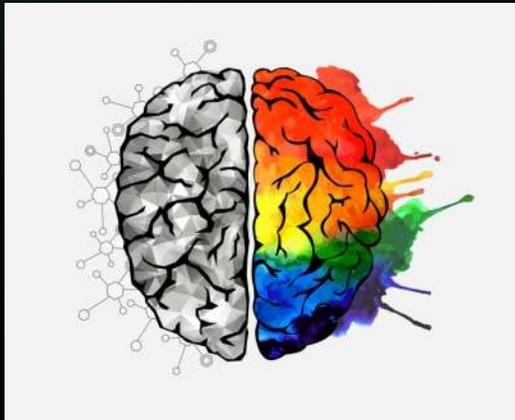
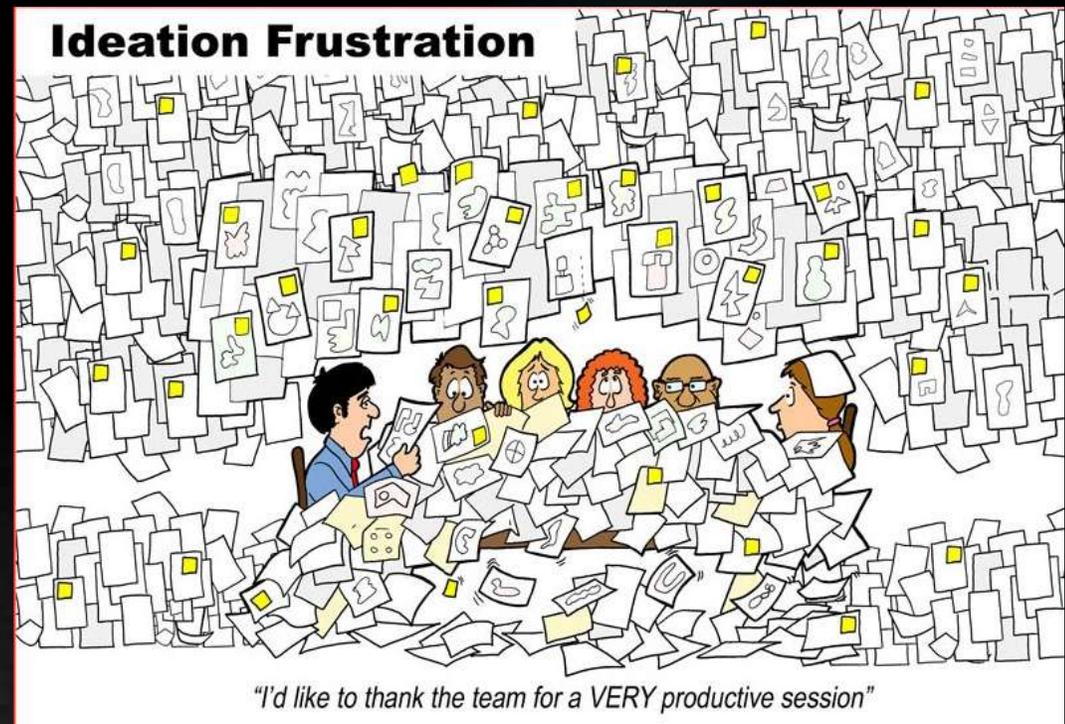
Understand the Problem

- ▶ Determine why current “solutions” don’t work
 - ▶ Important to find limitations of current products:
 - ▶ High cost, weight, reliability, etc
 - ▶ Ineffectiveness
 - ▶ Non-compliance or non-use
 - ▶ Poor aesthetics, functionality, durability, fit
 - ▶ Does not take advantage of current technology
- ▶ Why a new solution may not work
 - ▶ *“The old shoe is more comfortable.” Barbara (age 92)*



Brainstorming

- ▶ Also know as “Ideation”
- ▶ Idea Generation
 - ❖ Morphological charts
 - ❖ Brainstorming
 - ❖ Other techniques
- ▶ Develop multiple preliminary ideas, concepts



Rules of Brainstorming



- ▶ Rules: *"You can't brainstorm alone"* - Dave
 - ▶ Defer judgment - do not critique
 - ▶ Produce lots of ideas
 - ▶ One person talking at a time
 - ▶ Be visual - draw something quickly
 - ▶ Build upon the ideas of others
 - ▶ Stay on topic
 - ▶ Explore wild ideas, including suspending reality



- ▶ What would they do on Star Trek?
- ▶ Violate the Laws of Physics
- ▶ Use Harry Potter's magic wand
- ▶ Use "The Force"



Selecting Design Concepts



- ▶ Select best design concepts using a Pugh Chart
 - ▶ Plot best design concepts vs design criteria
 - ▶ Ability to meet requirements & criteria
 - ▶ Prototype fabrication cost
 - ▶ Complexity (consider skill level of fabricators)
 - ▶ Ability to complete within allotted time and budget
 - ▶ Caregiver issues



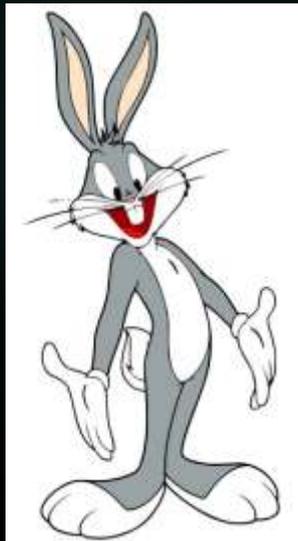
Criteria for Success		Option 1		Option 2		Option 3	
Common Theme	7	7	49	6	42	10	70
Expands Knowledge	5	5	25	3	15	7	35
Accurate Info	9	8	72	8	72	7	63
Appealing	8	6	48	9	72	7	56
Unique	10	9	90	6	60	6	60
3 different forms of media	10	9	90	7	70	8	80
Reflects Rauschenberg	4	7	28	10	40	6	24
	TOTAL	402		371		388	

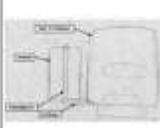
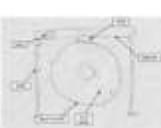
- ▶ Weights - which features are most important?

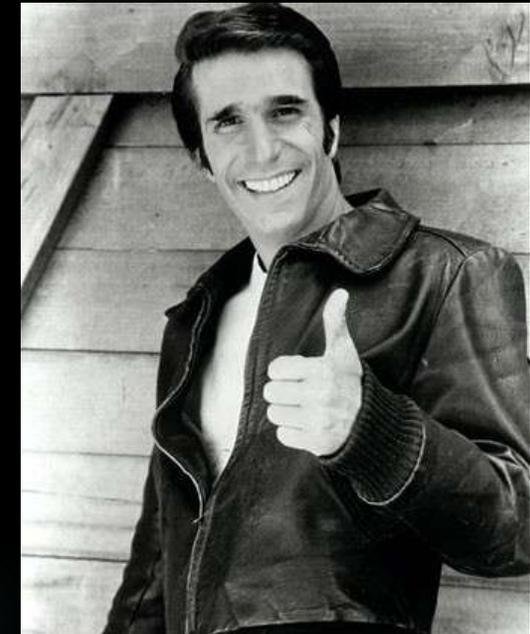
Selecting Design Concepts

Don't forget aesthetics and coolness factor

- ▶ Users won't buy or use a product that identifies them as disabled
- ▶ Users want to look cool
- ▶ You want to work on something cool



Description		Kimberly Clark Paper Towel Dispenser	Side Roll	Paper Quantity Sensor	Clear Windows	Free-Standing w/ Recycling	Foot Pedal
Sketch							
Criteria	Weight	Datum	Design 1	Design 2	Design 3	Design 4	Design 5
Reliability	2	0	+	0	0	0	-
Hygiene	3	0	-	0	0	0	+
Ease of Use	3	0	+	0	0	+	+
Safety	2	0	0	0	0	0	0
Durability	1	0	0	0	0	0	0
Aesthetics	1	0	-	0	-	--	-
Ease of Replacement	1	0	0	+	+	0	0
Environment	2	0	0	0	0	+	--
+		0	5	1	1	2	6
0		15	6	15	13	9	4
-		0	4	0	1	2	7
Net Score		0	1	1	0	0	-1



Selecting Design Concepts



	Concept 1	Concept 2	Concept 3	Concept 4	Weight
Criteria					
Cost	2 / 4	-2 / -4	0 / 0	2 / 4	2
Weight	0 / 0	-4 / -16	0 / 0	4 / 16	4
Size	3 / 9	3 / 9	3 / 9	0 / 0	3
Coolness	-5 / -25	0 / 0	0 / 0	5 / 25	5
Other criteria	4 / 24	3 / 18	2 / 12	1 / 6	6
Totals	12	7	21	51	

Thursday, January 26th



Designing Beyond the Norm to Meet the Needs of All People

Peter W. Axelson, MSME, ATP, RET

Beneficial Designs, Inc.

Director of Research & Development

Today

Perspectives of Stanford Students with a Disability



Kartik Sawhney



Zina Jawadi

Angelica Parente



Edan Alexander Armas

Bryce Connor Tuttle



Hannah Joy Root



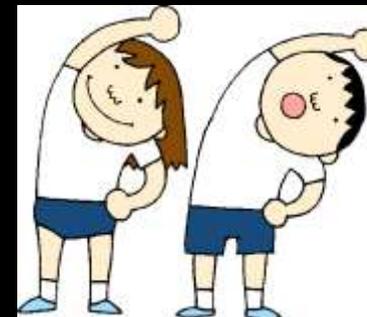
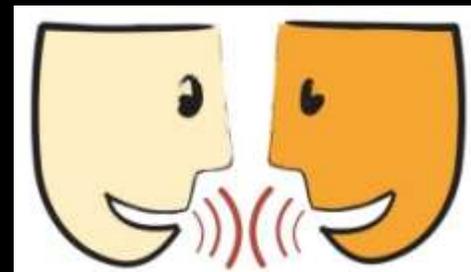
Short Break



Break Activities



- ▶ Sign attendance sheet
- ▶ Grab a cookie
- ▶ Stand up and stretch
- ▶ Take a bio-break
- ▶ Text message, web-surf, email
- ▶ Talk with classmates
- ▶ Reflect on what was presented in class



Today

Perspectives of Stanford Students with a Disability



Kartik Sawhney



Zina Jawadi

Angelica Parente



Edan Alexander Armas

Bryce Connor Tuttle



Hannah Joy Root



Kartik Sawhney



"I am a senior at Stanford University, majoring in Computer Science with a focus on Artificial Intelligence and Human Computer Interaction. I feel strongly about universal access to virtual resources, and have been involved in several accessibility and assistive technology projects with non-profits and tech giants including IBM Research India, Microsoft Research India, Xavier's Resource Center for the Visually Challenged, among others. At the same time, I'm intrigued by the immense potential of artificial intelligence, and hope to further develop my knowledge and skills in the field."

Zina Jawadi



Zina Jawadi is a junior at Stanford University and is involved with disability advocacy on campus through Power2ACT and the ASSU Executive Cabinet. Outside of Stanford, Zina is the president of the Hearing Loss Association of America, California State Association, an affiliate of the Hearing Loss Association of America, the largest nonprofit representing people with hearing loss in the US. Zina founded a disability awareness program at her high school, The Harker School, and previously researched and created a video about techniques for teaching mainstreamed students with hearing loss.



Khattiyya!

Zina Jawadi

January 2017



Highlights

- Personal Background
- FM System
- Captioning
- Hearing Aids
- Safety Technology



Highlights

- **Personal Background**
- FM System
- Captioning
- Hearing Aids
- Safety Technology



Highlights

- Personal Background
- **FM System**
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- Safety Technology





Highlights

- Personal Background
- FM System
- **Captioning**
- Hearing Aids
- Safety Technology



← ▷ 2015-01-09 (Fri) PHYSICS 41 - Mechanics - Stanford University (Winter 2015)

desk. Lecture two notes, if you happened to have missed that. Also with the discussion one learning goals. They will always be there if you need them.

Number one is due at 6 o'clock. The TA boxes are now labeled on the second floor. You can put your box number on your problem set. That's just a backup. Normally the TA' will try to have your [indiscernible] created. If you happen to be ill and missed the section they will put it in your box. Those box numbers will be assigned early next week. Finally the practice tutorials are available for chapters 1 and 2, I encourage you to use those.

First thing we will do is start with a click question. Get your clickers out, and we will do three today. I ask you to turn to your neighbor and discuss the question. I really mean you and you to turn to your neighbor, every one of you. So what I would like you to do now is, before we do the question, turn to your neighbor and introduce yourself and tell the person why you are in the class. If you already know the person next to you, talk to that person.

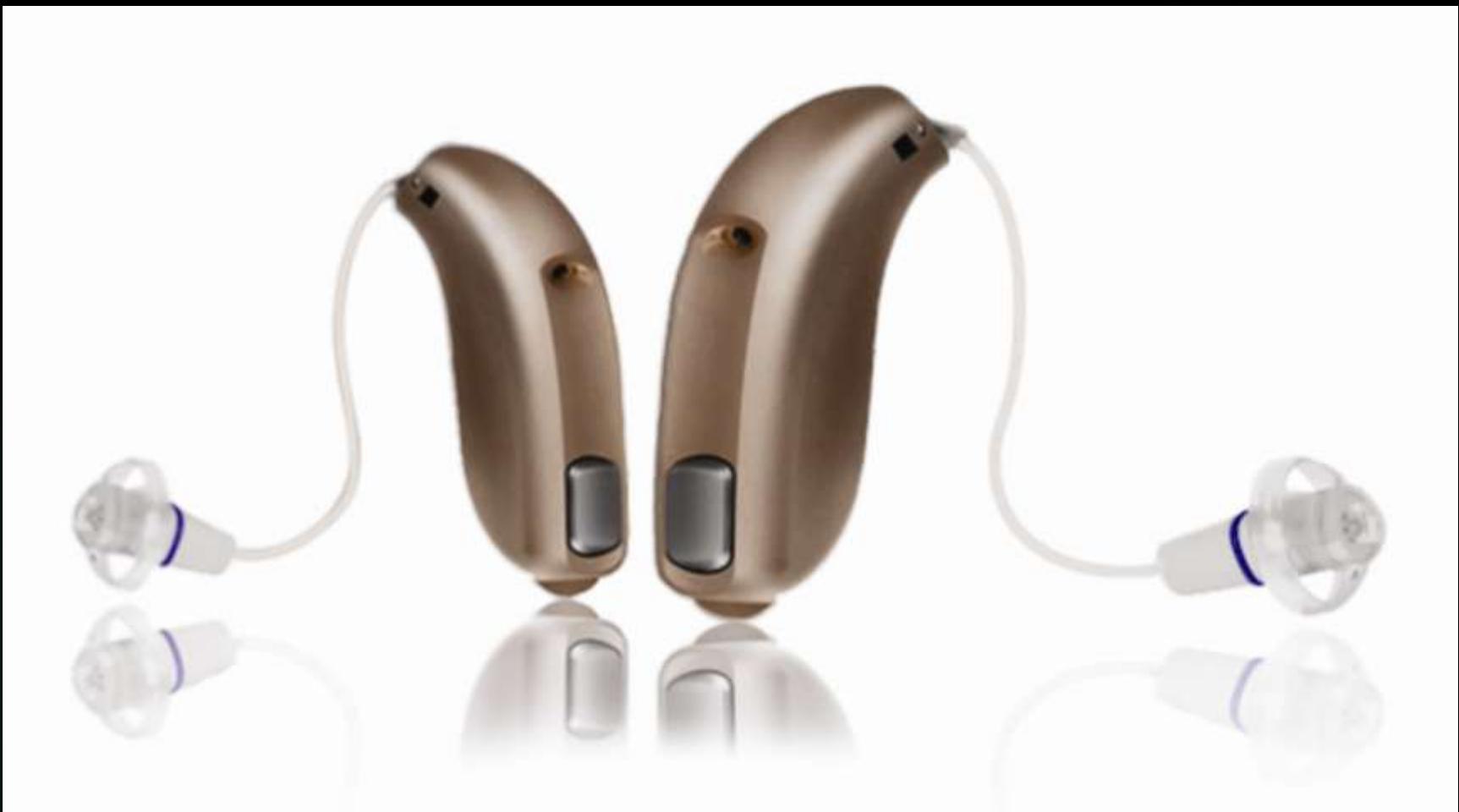
Thanks for introducing yourselves. Before we do the first question, since some of you may have the clicker for the first time, we have to set the frequency to AB. You only do this once for the quarter. If you have not done it already, hold down the button for two seconds. Your frequency should flash. Press A and then B. If you are late, ask your neighbor.



Highlights

- Personal Background
- FM System
- Captioning
- **Hearing Aids**
- Safety Technology





Highlights

- Personal Background
- FM System
- Captioning
- Hearing Aids
- **Safety Technology**



RFI **RFI**
DEVICE IS:
OUT-OF-SERVICE
FOR MORE
INFORMATION CALL:
650-725-1602
Do not remove by order of:
Stanford Fire Marshal's Office



Highlights

- Personal Background
- FM System
- Captioning
- Hearing Aids
- Safety Technology



Khattiyya!



Mazel Tov!



Angelica Parente - Sick today



“I’m Angelica, but ever since I got my hip replacement my friends like to refer to me as a cyborg. I’m currently a PhD candidate in Biophysics at Stanford University, working to bridge single molecule microscopy with computational simulations to understand how the 3D protein structure is related to biological function. I also curate events for the Stanford Biotechnology group, and in the future hope to work in biotech entrepreneurship and/or investment to improve the lives of patients. I’m passionate about patient-centered design in all stages of healthcare and believe that people with disabilities have a unique perspective that enables creative solutions to problems in biomedicine.”

Edan Alexander Armas



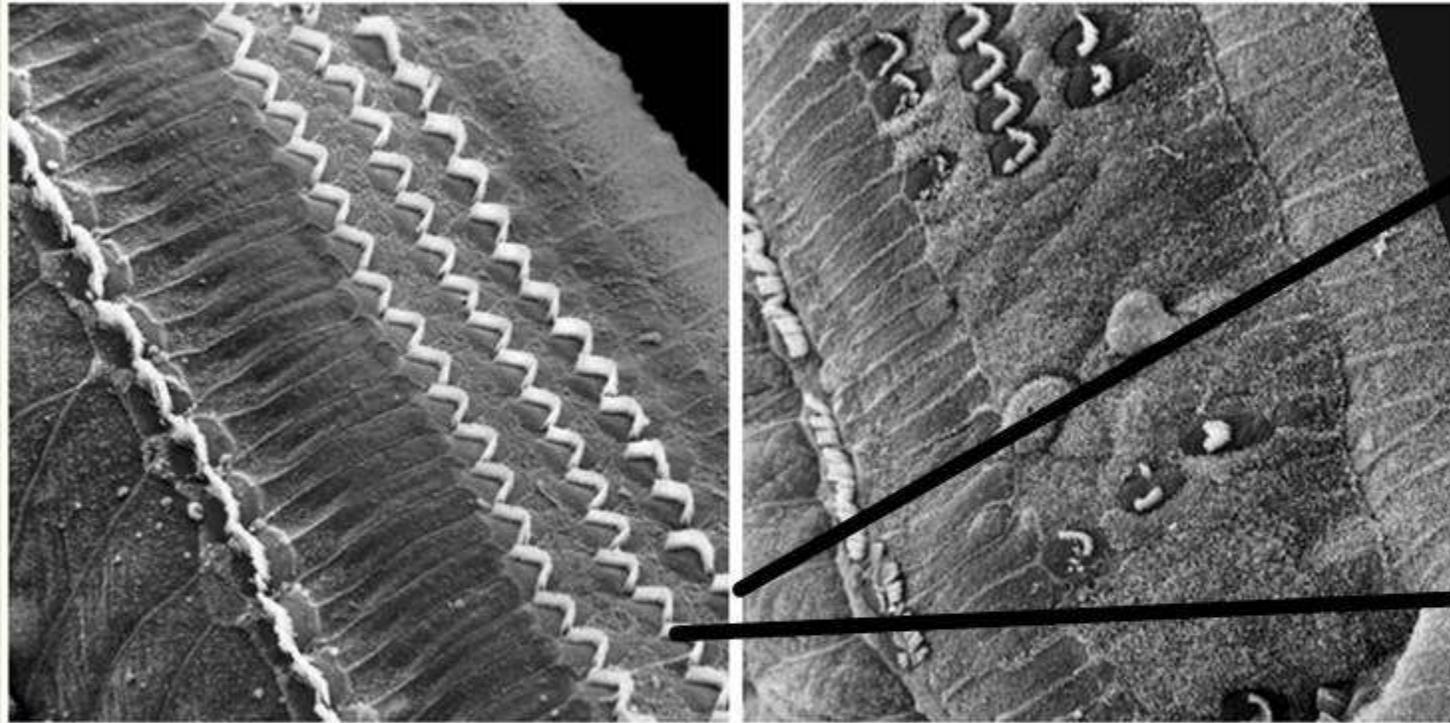
Edan Armas is a sophomore with a mild-to-moderately severe hearing loss. While his disability poses a myriad of difficulties to overcome, it also leads to enriching experiences and amusing (mostly only in retrospect) stories to tell. An active member of the Stanford Spoken Word Collective, he writes a lot about the power of listening, and how a hearing loss is an agent of humility that allows one to take a step back and internalize external information, whether that be a conversation or a poem ripe with emotion. Edan also specializes in acute existential despair - laughing at bad jokes - and when he's not falling: longboarding around campus.



THE STORY BEHIND “WHAT?”

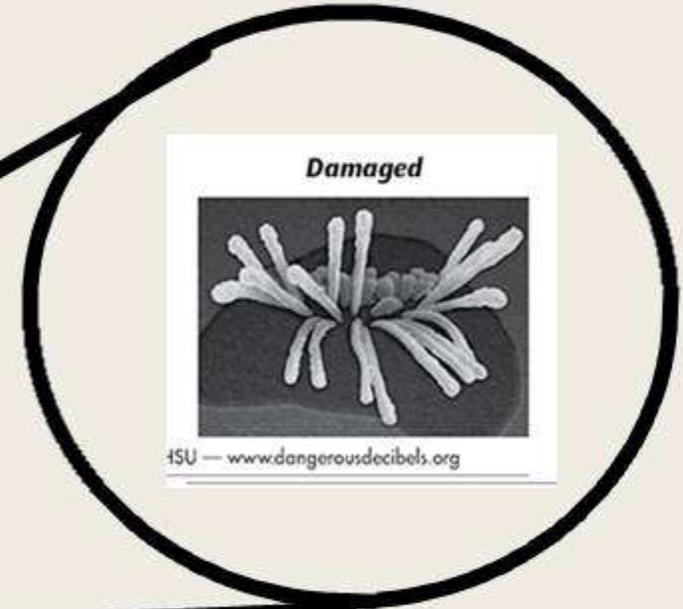
Edan Armas

The Worst Haircut of My Life



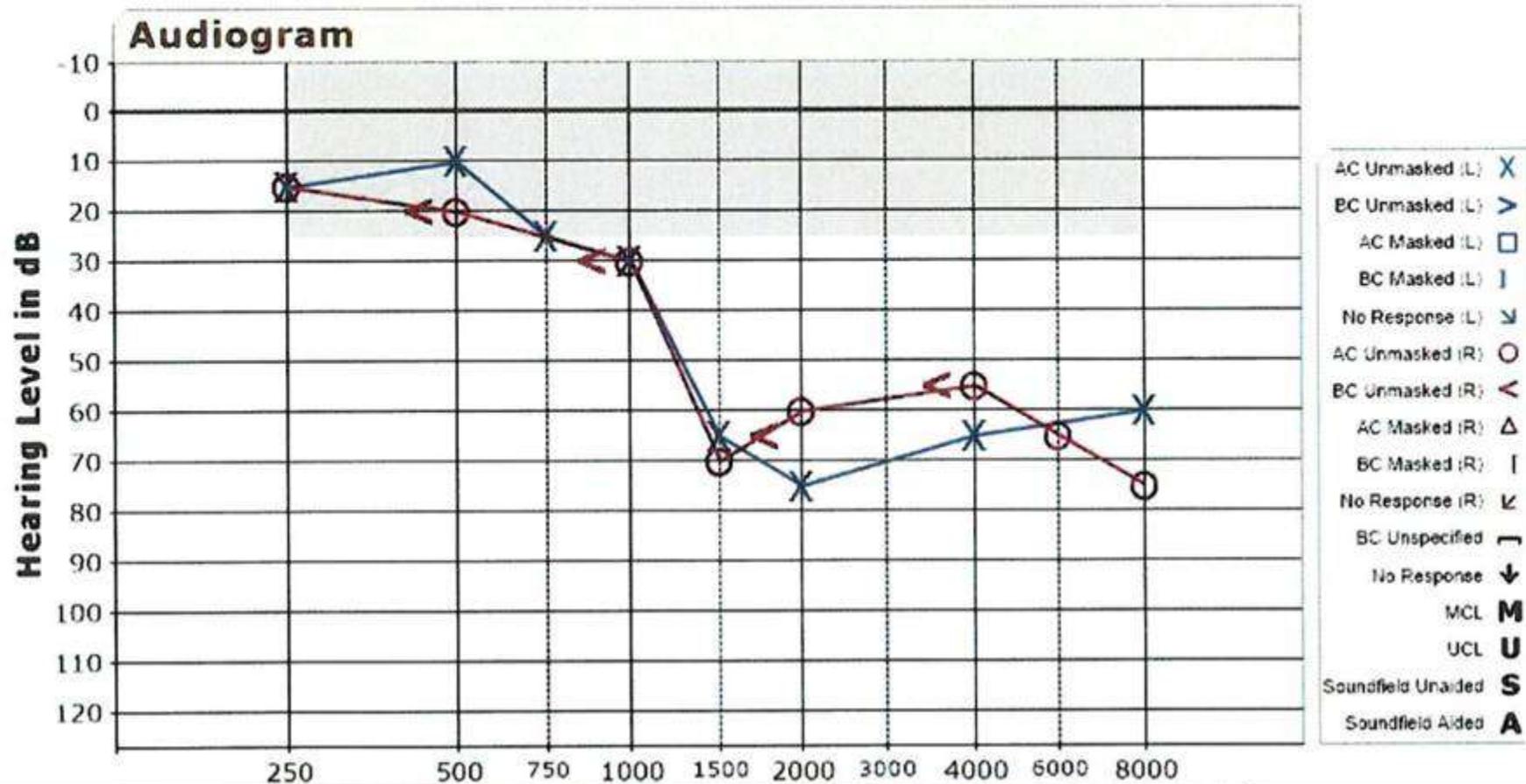
Intact cochlea

Damaged cochlea





A Mild-to-Moderately Severe Case





A Hearing Impairment

Literally
what

ORDERING FOOD



Literally
what

WHISPERS



Literally
what



Adverse

PARTIES



Adverse

SOCIAL CONVERSATION



Adverse

JOKES



TECHNOLOGY



Resilience

BEING ASSERTIVE

Bryce Connor Tuttle



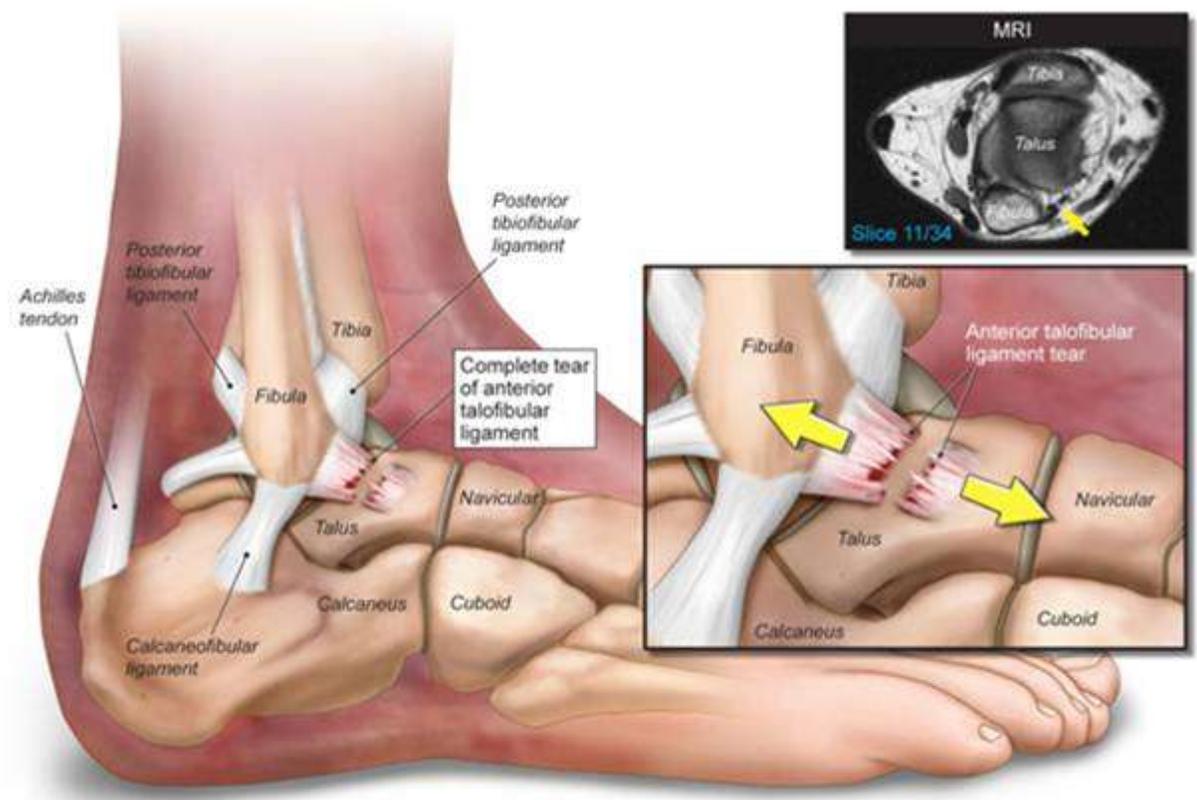
"It took me a while to learn how to read. Though I loved to hear my mom read aloud or listen to audio books, I struggled through deciphering each word, unable to piece together the chains of sounds my classmates could easily create from the letters on the page. In third grade I was diagnosed with dyslexia. It is a label I have carried with pride throughout the rest of my life. I credit my dyslexia with my ability to devise unorthodox solutions. As my uncle says, 'only coming up with one way to spell a word is terribly uncreative'."

Hannah Joy Root



"Hannah Joy is my name and recently I've spent a lot of time on phones and online inquiry boards describing myself as someone with a handicap who needs to know more about their accessibility options. No, it's not enough to know if there is parking or a ramp on location. I work at the Stanford d.school as the Community Experience Coordinator. Beyond a d.thinker, I'm an elementary school teacher and athlete (biker, rock climber, swimmer, runner, and soon-to-be-surfer). A recent foot / ankle surgery has left me with several life interruptions: the use of a knee scooter and walking boot, 2-3 weekly specialist appointments, and an active lifestyle turned upside down."





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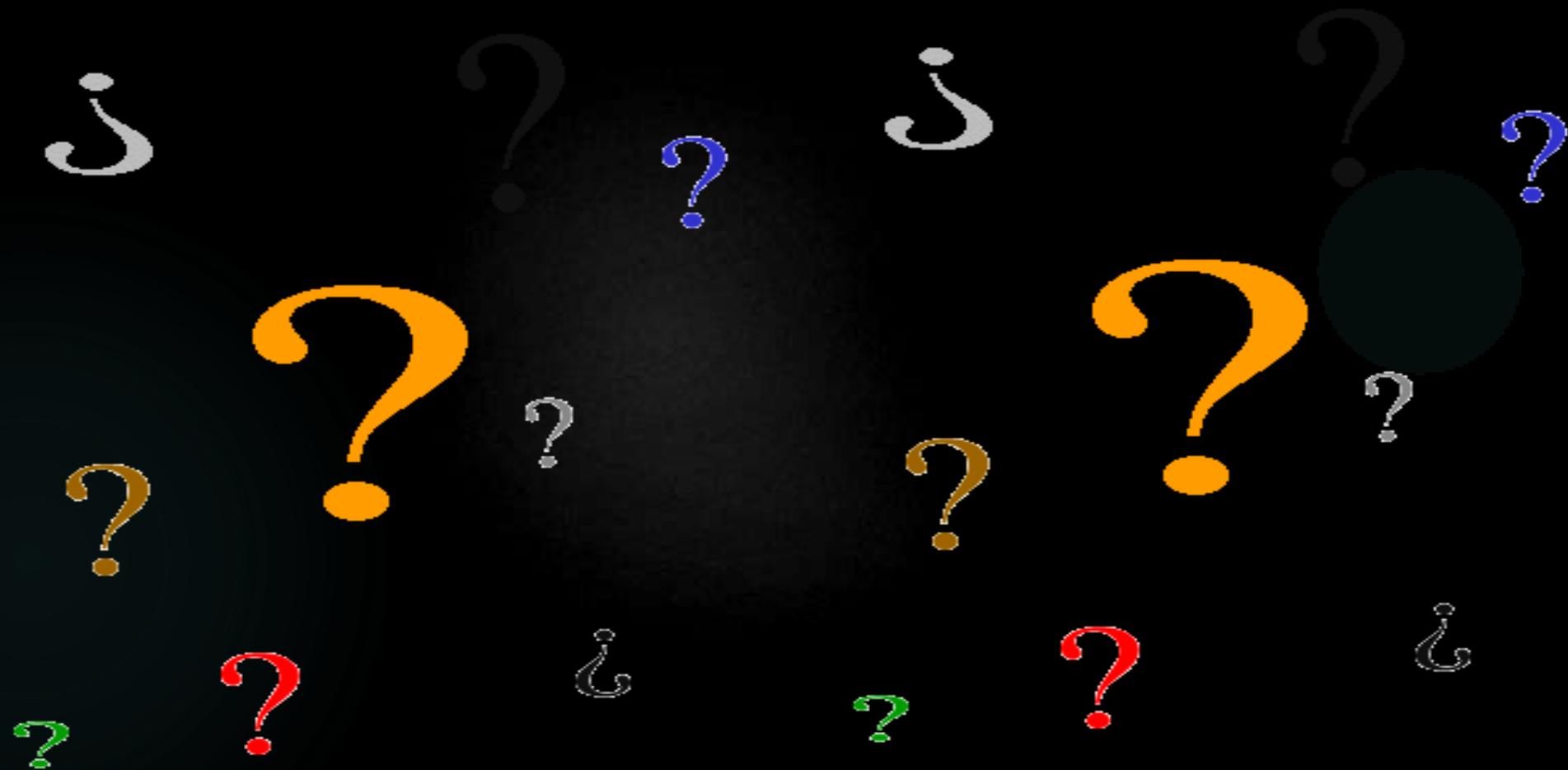
BROSTRÖM PROCEDURE







Questions?



Adjourn



class dismissed



Laptops Galore

