

# Inclusive & Accessible Design

No screens



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Slides by Katy Gero  
COMS 4170  
2 March 2020

Say your name



# Color and accessibility



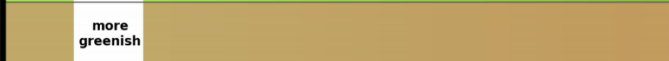







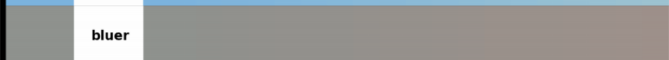









TEST TYPE	$r'_c$	$w$	$\vec{w}_g$	$t_c$	COS SIM	DELTA-E
Seen Pairings		darker			0.97	0.9
		more greenish			-0.76	20.0
Unseen Pairings		lighter			0.94	4.2
		darker			0.77	12.3
Unseen Ref. Color		lighter			0.93	2.7
		bluer			-0.93	17.4
Unseen Comparative		more neon			0.96	1.3
		more neon			-0.14	26.1
Fully Unseen		paler			0.99	3.5
		rustier			-0.73	18

Figure 3: Examples of learned comparatives for each test condition

Olivia Winn and Smaranda Muresan.  
 "‘Lighter’ Can Still Be Dark: Modeling Comparative Color Descriptions." *ACL*. 2018.

- **2.4% of people** in the US has a visual disability – that’s 7.6 MILLION people.
  - US Census Bureau
- **8% of men** with Northern European ancestry have red-green color blindness.
  - From National Institute of Health
- **19% of people** in the US has some kind of disability.
  - US Census Bureau

What are the assumptions we  
make about people?

# What assumptions do we make about users?



- Right-handed
- Fine motor control to move mouse around
- Fine motor control for scroller and ball motion
- Enough strength to press the buttons/move the ball
- Sensitivity to find smaller buttons

# What assumptions do we make about users?



- They can see well
  - Distinguish between colors
  - Distinguish between small icons
  - Distinguish between small letters (when typing)
- They can hold it in their hand
  - Arm mobility
  - Grip strength
  - Fine motor control
- They have high control over their fingers

# How does a blind person use a smartphone?



# How does a blind person use a smartphone?

- Screen reader says out loud what is on the screen
- Gestures are generally not location specific
- Feedback on location specific gestures corrects for error

Inclusive design focuses on  
individuals



# The myth of average



## When U.S. air force discovered the flaw of averages

By **TODD ROSE**  
Sat., Jan. 16, 2016



In the late 1940s, the United States air force had a serious problem: its pilots could not keep control of their planes. Although this was the dawn of jet-powered aviation and the planes were faster and more complicated to fly, the problems were so frequent and involved so many different aircraft that the air force had an alarming, life-or-death mystery on its hands. “It was a difficult time to be flying,” one retired airman told me. “You never knew if you were going to end up in the dirt.” At its worst point, 17 pilots crashed in a single day.



# Pros and cons for designing for the average

## PROS

- Only have to design one system
  - Faster and simpler
- Maybe can model after yourself
  - Need fewer test users
- Almost always cheaper

## CONS

- Limit who can use your system
- Might be imperfect for **everyone**
- Might make incorrect assumptions about what average means
- Might never learn how to design for others

The World Health Organization  
redefined **disability**

It's not a property of a person,  
but a *property of a system*.

“If a system is designed perfectly  
(which may be impossible, but we can try)  
then no one would experience  
disability when interacting with it.”

– Sasha Sproch, Microsoft Accessibility Team

# Situational impairments

Disability is a property of a system, not a person.

# What are some situational impairments of this system?



Only has one hand

Distracted

Long coat

Diminished hearing

# What are some situational impairments?

## What are **your** situational impairments?

- Weather/environment
  - Rain
  - Cold temperatures
  - Light levels (too dark, glare on screen)
  - Ambient noise
- Physicality
  - Body motion
  - Clothing (e.g. gloves)
  - Device out of sight
  - Diverted gaze
  - Occupied hands
- Other people
  - Interruptions
  - Device changing state
- Cognitive
  - Distraction
  - Stress, fatigue, or haste
  - Intoxication
  - Multitasking
- Cultural
  - Language barrier

Inclusive design  
benefits *everyone*



# Who benefits?



People with:

- strollers,
- shopping carts,
- rolling suitcases...

# Who benefits?



People who are:

- in a rush,
- have hands full,
- with poor motor control
- Distracted
- Can't read English
  - Children
  - Elderly
  - Guests

# Who benefits?



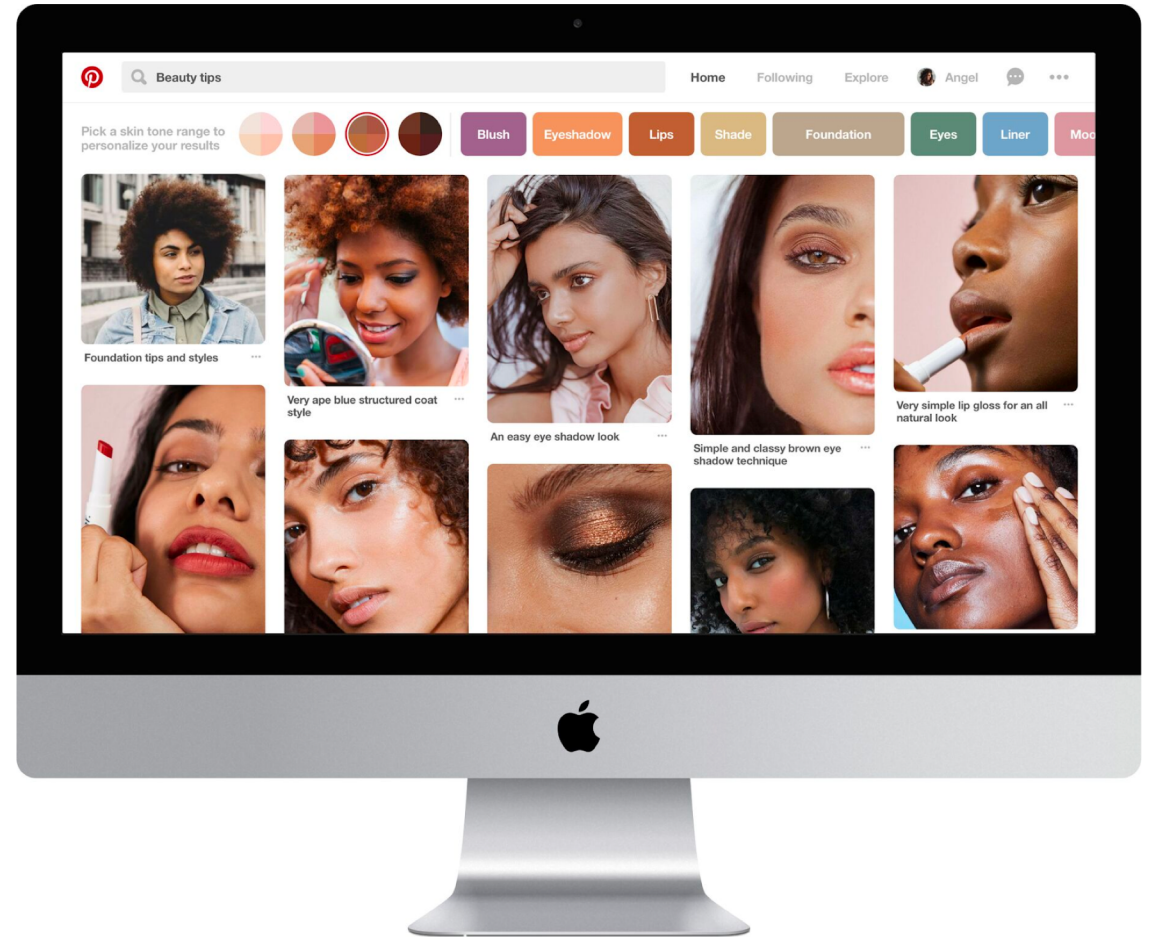
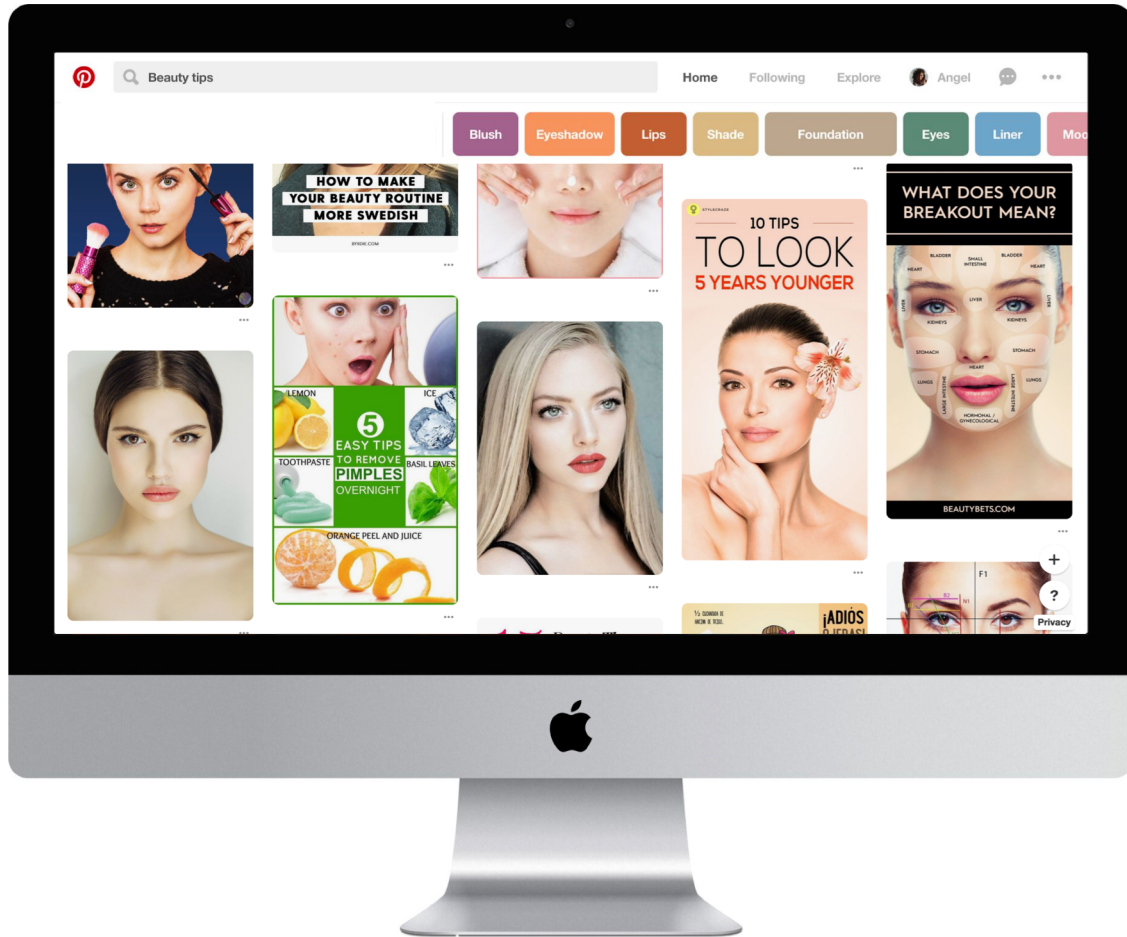
People with:

- sore hands,
- cold hands,
- dry hands,
- Lots of carrots to peel

What other kitchen stuff has  
been redesigned in the last 10 years?



# Who benefits?



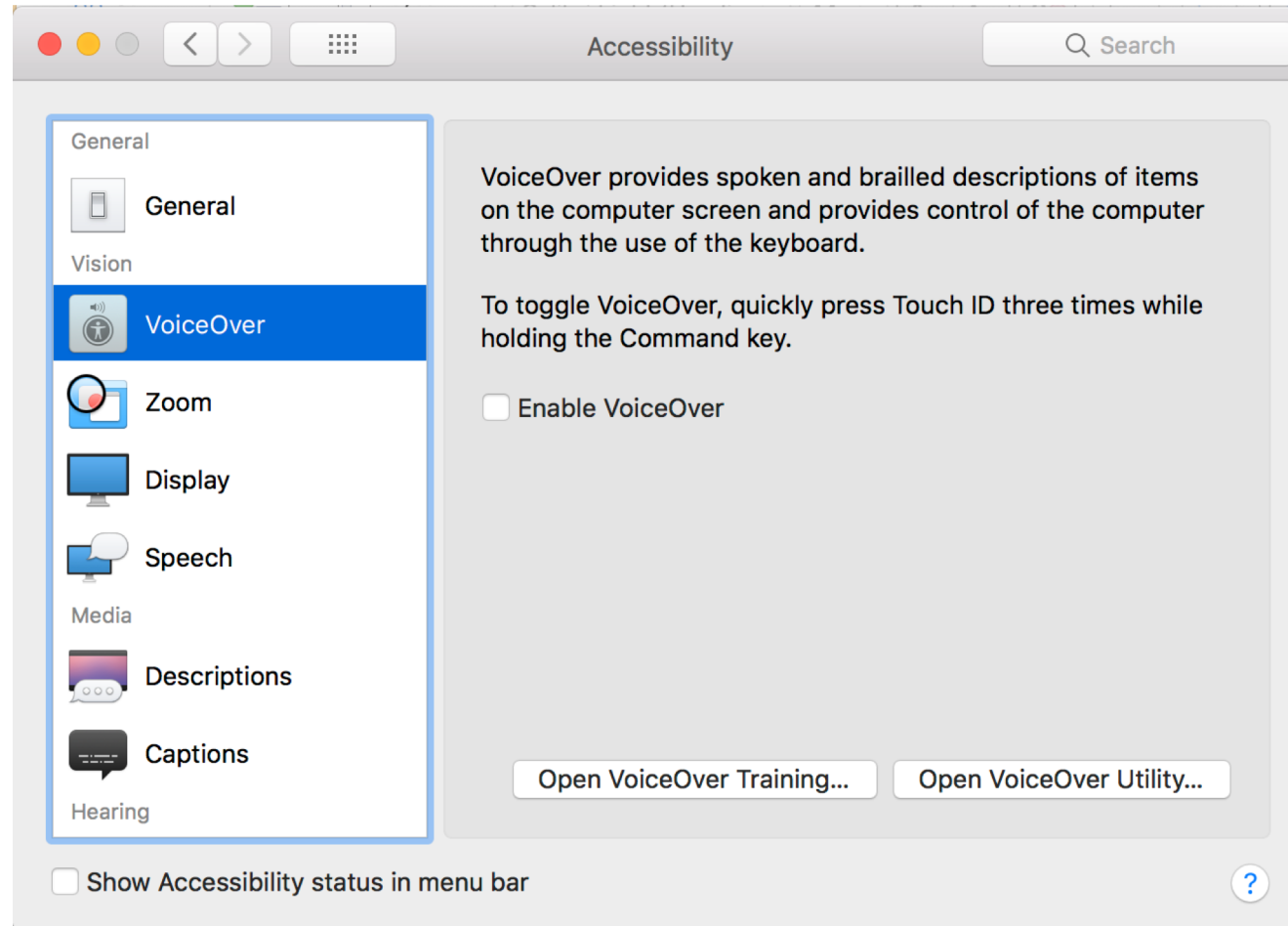
People with different skin tones (i.e. almost everyone)



Work by Professor Brian Smith

Blind/low vision and computers

# How do screen readers work?





# Designing for blind/low vision


“Close your eyes and unplug your mouse.”  
– advice from Microsoft accessibility designer

- Does the visual order align with the keyboard order?
  - If invisible elements are keyboard focusable, they become roadblocks if they have weird names.
- High contrast helps both those with colorblindness and low vision.
  - Browsers extensions can simulate this.
  - Use color last!
  - Use redundant visual principles (like color + underline for links).
- Use alt text for images (different from caption) – especially logos!

# Web Accessibility: Use Alt text

Doritos Tortilla Chips, Nacho Cheese, 1.75-Ounce Large Single Serve Bags (Pack of 64) Doritos

★★★★☆ 175 customer reviews | 9 answered questions



**About the Product**

- Pack of 64, 1.75-ounce large single-serving bags (total of 112 ounces)
- Doritos tortilla chips with classic nacho-cheese flavor
- Made of whole corn; flavorings feature real cheddar cheese

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|---|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|



# Design Day

**Thurs, Feb 27th**

Kraft Center

**Design Industry Keynote**

6-7PM

Professor Harry West,  
Former CEO at frog design

🍕 *Pizza Included* 🍕

**Breaking into Design Panel**

7-8PM

Columbia designers from companies  
including Google, United Nations, Airbnb,  
IDEO, Tencent, and Nike

**Fri, Feb 28th**

Pulitzer Hall, 1st Floor

**How to Get a Design Job**

2-3PM

Portfolio & Design Recruiting

**Building Practical Design Skills**

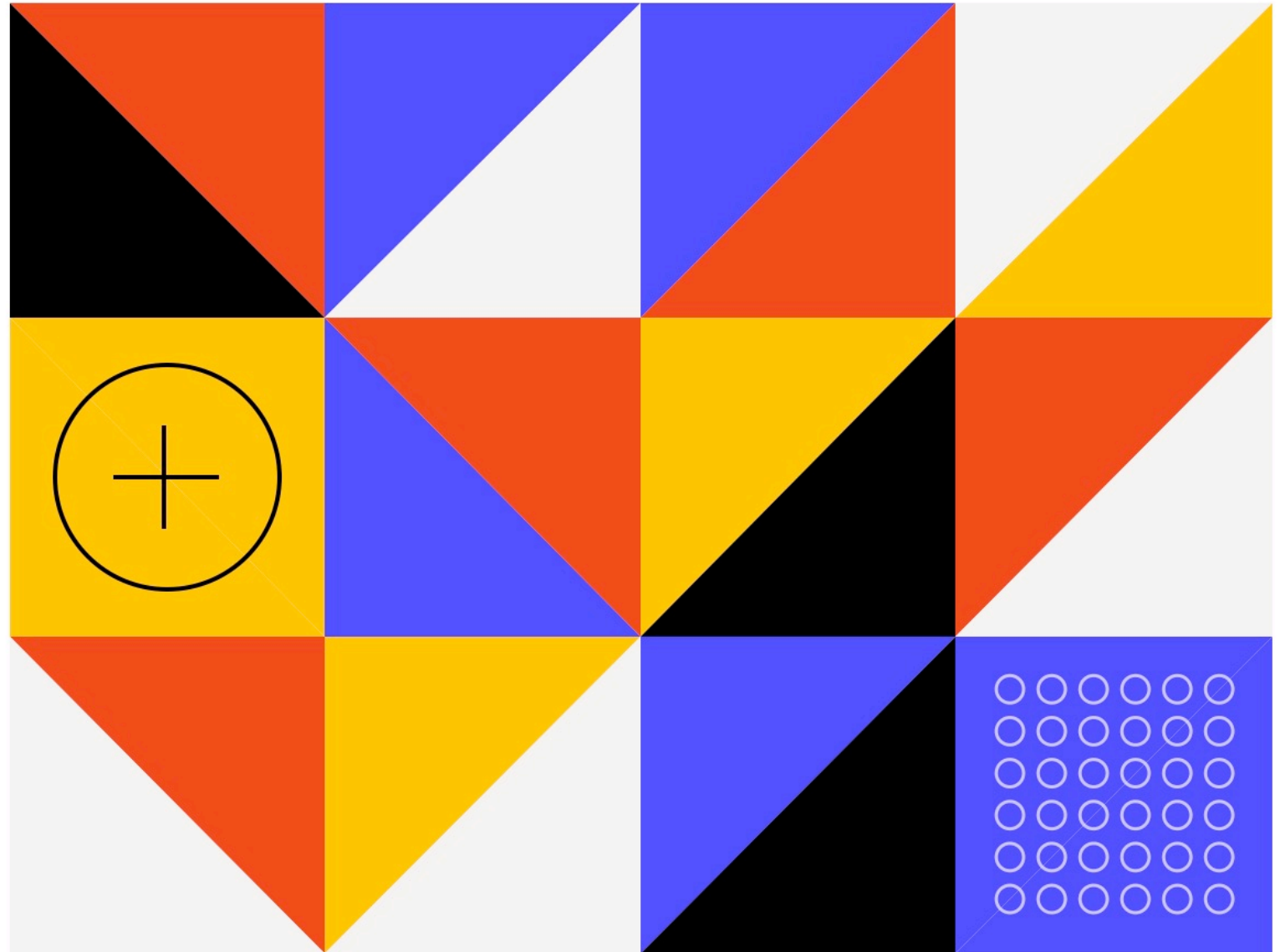
3-4PM

Figma 101

**Creating Your Design Story**

4-5PM

Branding & Storytelling



RSVP & get more info: [bit.ly/designcolumbia](https://bit.ly/designcolumbia)

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