

# Input, Interaction, and Accessibility

Spring 2019 · Shaun Kane



# Today

- Introduction to the course
- Mini design activity

# But first... warm-up discussion

- Discussion an important part of this class
- But discussion is tough with 50+ people
- So, we'll experiment a little bit
- Today, we'll talk in small groups and share feedback at [menti.com](https://menti.com/606736), code 60 67 36
- (If you don't have a device today, don't worry)

# Get to know your neighbor

- Chat with your neighbor
- Name? Program? Goals for the course?
- **Discussion question 1: Do you have a superpower? What is it?**
- Share at [menti.com](https://www.menti.com/join/606736), 60 67 36



# Some superpowers

- One
- Two
- Three
- Four
- Five
- Six

# Why talk about this?

- Much of our work in this class is going to be about accommodating **differences**
- Can be negatives or positives
- Individual differences can come from many sources

# Discussion #2

- What's an **unusual** input device that you have used?
- [menti.com](https://www.menti.com), 60 67 36

# Input devices

- One
- Two
- Three
- Four
- Five
- Six



# Themes

- We'll spend a lot of time thinking about input devices
- What can we measure about what people are doing?
- How can we do interesting things with that data?

# More introductions

- Post a brief introduction to yourself on Canvas before next class (I'll remind you)

# Who I am (briefly)

- Associate Professor of Computer Science, affiliated with Information Science and ATLAS
- 5th year at CU (2nd time teaching this class)
- Director of the [Superhuman Computing Lab](#)
- Use AT in the car, StickyKeys on the computer, sometimes captions on TV
- Interests: Board games, Spider-Man, cool animals





# Interesting input devices



“suicide knob”



Theremin



# My credentials

- Lifetime AT user and complainer
- Trained with [Jacob Wobbrock](#) and [Richard Ladner](#) at University of Washington
- HCI researcher since 2005
- Visiting accessibility researcher at [Microsoft Research](#)

# Some of our lab's research

- Designing touch screen user interfaces for blind people
- Exploring tools for cross-ability collaboration
- Understanding the social implications of wearable assistive devices
- Designing tactile animations using autonomous robots
- You'll learn more in class (or ask me!)

# About the course



# CSCI 4849/5849

- Input →
- Interaction →
- Accessibility →

# CSCI 4849/5849

- Input → how to control our computing devices
- Interaction →
- Accessibility →

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- Input → how to control our computing devices
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# CSCI 4849/5849

- Input → how to control our computing devices
- Interaction → designing interactive systems
- Accessibility → focus on “extra-ordinary” interactions

# Input course or an accessibility course?

- Best of both worlds
  - Solve accessibility problems through deep understanding of input
  - Understand input across a broad range of input device types
- What I know best, and care about most

# (Some) goals of the course

- Survey of how we interact with computing technologies: pointing, text entry, gesture, speech, etc.
- Consider users' abilities in context
- Identify disconnects between a user's ability and input methods
- Explore "extra-ordinary" use cases: users with differing abilities, emerging user interface technologies
- Build prototypes of interactive systems (GUI, speech, eye gaze, etc.)
- Employ human-computer interaction (HCI) methods to remove technology barriers

# 4849 vs. 3002 (or 5839)

- More depth into modeling & understanding interaction
- More prototyping (including code)
- Forward-looking technology
- Explore how to do things *differently*



- **3002 project:** Design an improved results page for the library
- **4849 project:** Design a hands-free interface to enable librarians to answer questions while climbing the stacks





# Brainstorming

- How could we enable the librarian to answer questions from the stacks?
- [menti.com](https://www.menti.com), 60 67 36



# How is this useful?

- As computer scientists, we have a real opportunity to improve fairness and equality by considering and including underrepresented groups
- OK great, but what if I don't care about that? What if I think disability is a sign of demonic possession?
- Knowing this stuff is still useful





# Emerging technology

- How do we take advantage of new interactive technologies?
- How to understand what works and doesn't work (and why)?





# PWD are tech explorers

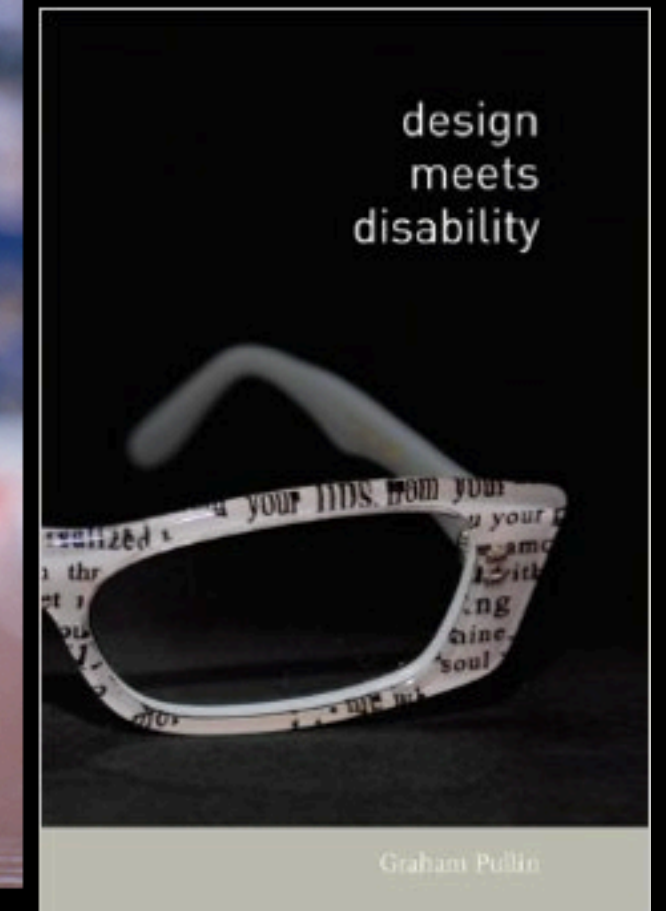
- People with disabilities often encounter (and solve) tech problems before everyone else does
- Examples: texting, speech-based interfaces, eye gaze





# AT is cool

- Assistive technology is cool
- Accessible design is often good design
- Examples: Good Grips kitchen tools, carbon fiber prosthetic legs, fashionable eye glasses, 3D printed Iron Man prosthetic hand



# Abilities are dynamic

- Consider:
  - Older adult with Parkinson's disease
  - Astronaut on a space walk
  - Violinist during a performance
- Each experiences reduced hand dexterity
- Experience similar in some ways, different in others (can they change situation? training?)
- Core question: what is the user's ability in context?





# GUI design is boring

- Quick: imagine the user interface for a mobile phone messaging app
- Everyone can do it, and the end results will probably be very similar and **boring**
- Where is interesting design happening?
  - Emerging and atypical interactions

# How will this help me?

- May open up job opportunities ([teachaccess.org](https://teachaccess.org))
- Get a head start on emerging trends in interaction (e.g. voice interfaces)
- Practice in designing technology to match user needs and abilities
- Assistive technology is a great area to explore innovative design

# Course mechanics

# Course resources

- <https://canvas.colorado.edu/courses/25422>
- Syllabus, calendar, assignments, discussion board

# Typical week

- **Monday:** Reading due at 3pm, lecture & discussion in class
- **Wednesday:** In-class activity (finish before next Wednesday)

# What you'll need for class

- Some computing device
  - Laptop is ideal; let me know if that's a problem
- Blank paper and materials for sketching
- Web resources: Canvas, Google Drive, Github Pages

# Assignments and grading

- Weekly reading assignments (25%)
- In-class activities (40%)
- 3 big projects (30%)
- Participation (5%)
- Grad research project



# (Some) planned topics

- HCI history
- Prototyping GUIs
- Modeling input
- Web accessibility
- Blindness and low vision
- Speech input
- Alternative input: switches, eye gaze
- Non-visual UIs
- Tactile interaction
- Crowdsourcing for a11y

# Some course policies

- **Accessibility policy:** When possible, we will make all our media (documents, images, videos, etc.) accessible
- **Attribution policy:** We will cite all sources for everything we use

# How to get an A

- Do all reading assignments, weekly activities, and projects *on time*
- Finish projects early with some time to collect feedback and iterate
- Participate as an active learner in the classroom

# Questions?

- [menti.com](https://www.menti.com/join/606736), 60 67 36
- or just raise your hand
- (we'll go over any other syllabus Qs on Wednesday)

# For next time

- HCI in History
- Watch Engelbart's [“Mother of All Demos”](#)
- Read the syllabus, come with questions
- Say hello on the Canvas discussion

**Design activity**



# Design Activity

- This is [Kavita](#)
- Kavita has Spinal Muscular Atrophy and uses the Beam robot for telepresence
- What kinds of accessibility challenges would Kavita experience in a class like this?
- Let's brainstorm problems (as a class) and solutions (with our neighbors)



# Problems and solutions

- [menti.com](https://www.menti.com/join/953103), 95 31 03



# More examples of Cool AT

- [Microsoft eye-gaze wheelchair](#)
- [Steve Gleason, eye-gaze communication](#)
- [History of ATs](#)