

**SPIRE-EIT**  
**Welcome Orientation 2024**



**IOWA STATE UNIVERSITY**

**VRAC** Visualize • Reason • Analyze • Collaborate

# Outline

Why are you here?

What's an REU? What's this REU?

What's HCI?

Spaghetti & Marshmallows

# Who's funding this?

National Science Foundation's CISE Directorate:  
Computer & Information Science & Engineering



IOWA STATE UNIVERSITY

College of  
Engineering

Graduate  
College



# Why are you here?

Well, who's funding it? What do they want?

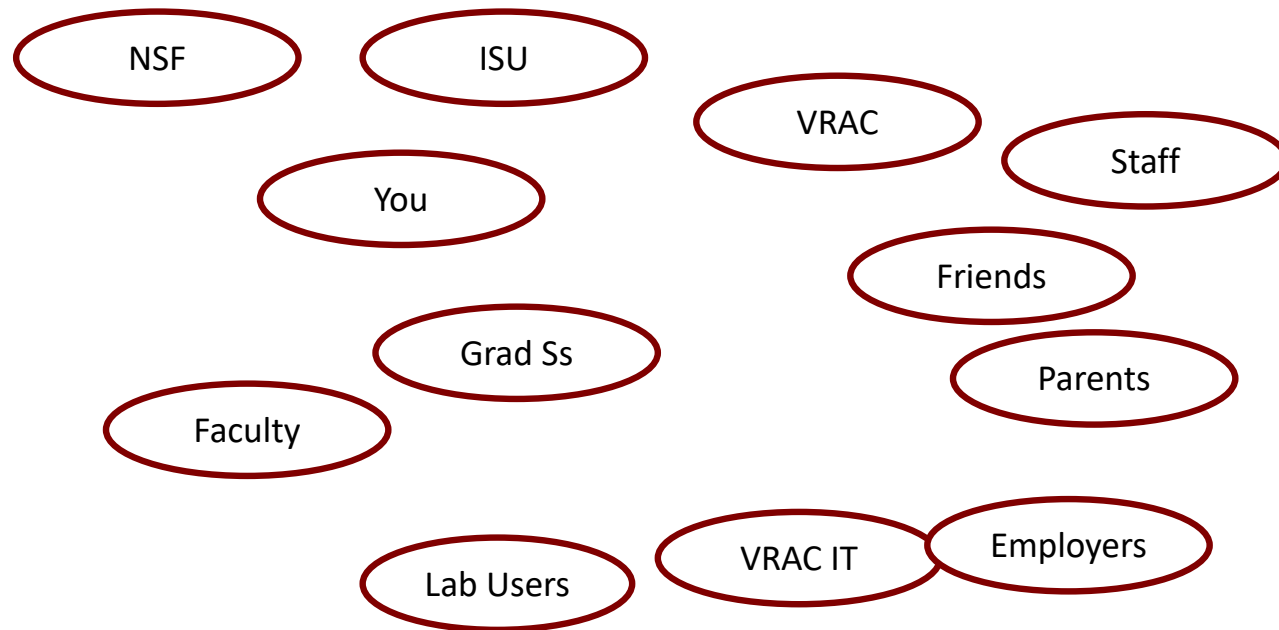


- A. NSF
- B. DoD
- C. DoEd
- D. NIH
- E. TLA
- F. Templeton Foundation
- G. Kauffman Foundation
- H. MacArthur Foundation
- I. Gates Foundation
- J. XPRIZE Foundation
- ...

# Stakeholders in a Design



# Stakeholders in the REU Design



# Emerging Interface Technologies

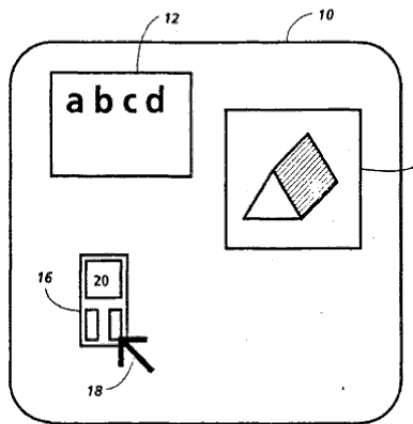
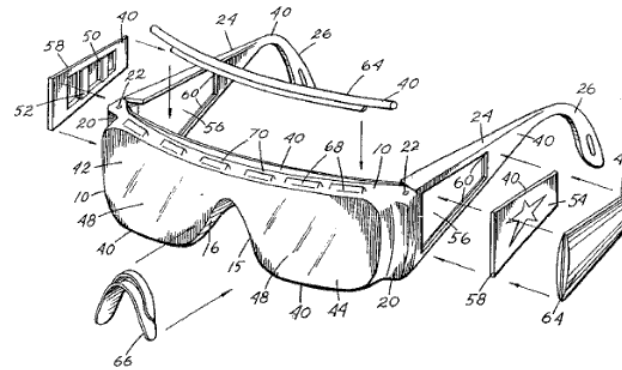
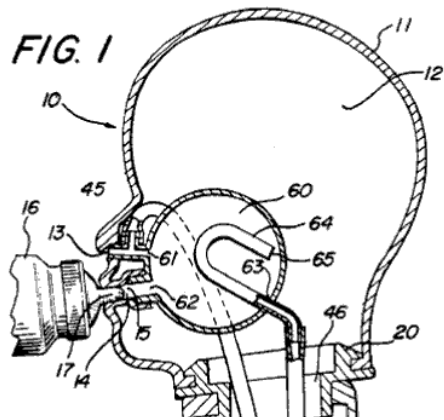
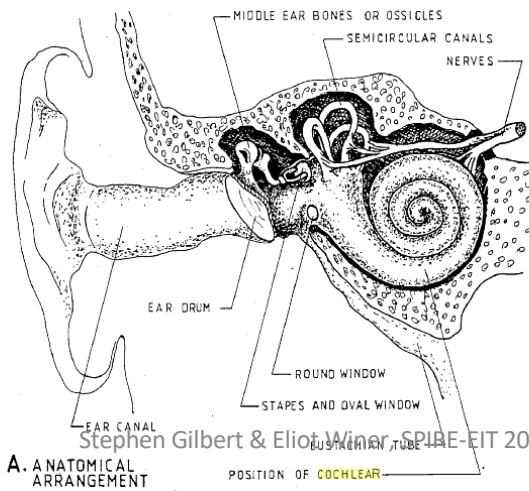


FIG. 1A



A. ANATOMICAL ARRANGEMENT POSITION OF COCHLEAR

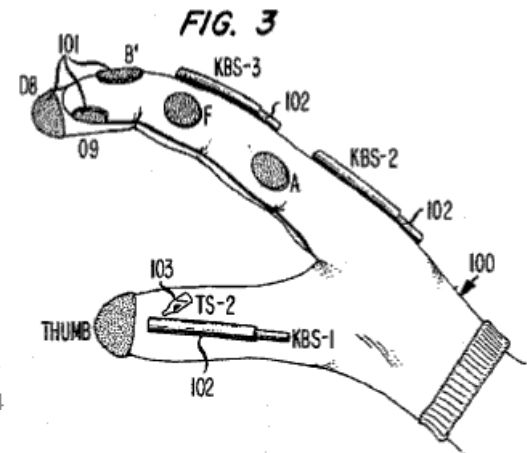


FIG. 3

# “Natural” Interfaces

Map your learned expectations about the world onto the system's structure.





This is a blicket. Draw 3 more.

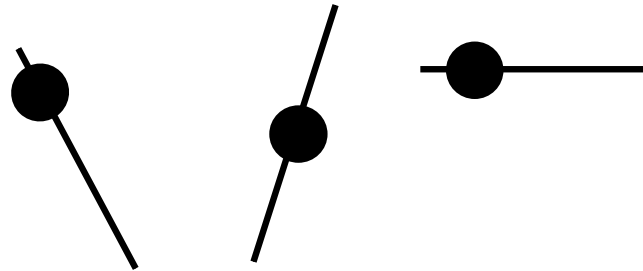


This is a blicket. Draw 3 more.

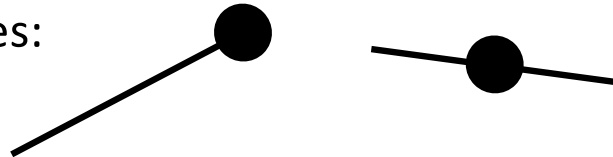


Special:  
Straight  
Round  
Alignment  
Endpoints  
Middleness

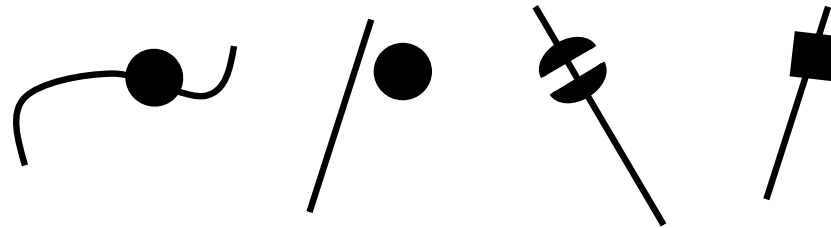
Typical:



Sometimes:



Rare:



This is a dax.



Which of these is a dax?

A



B



C



D



This is a dax.



Which of these is a dax?

A



B



C



D

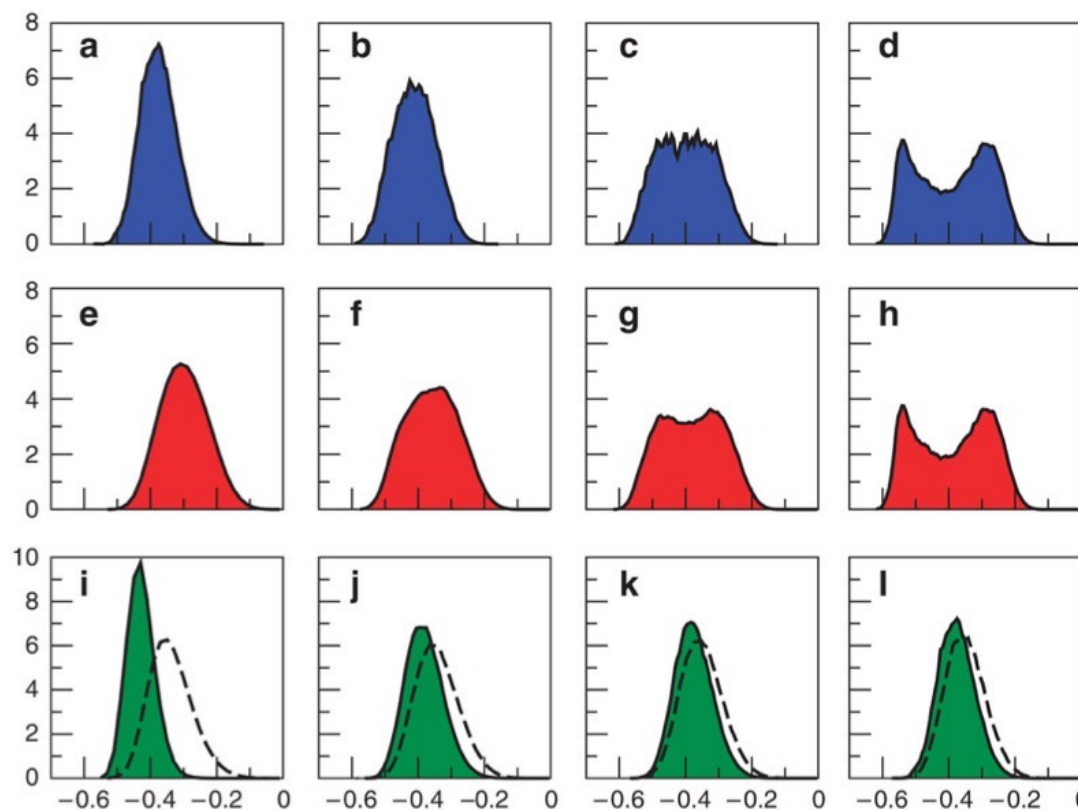


# Your head is full of probability distributions!

These are your expectations.  
They help you survive.

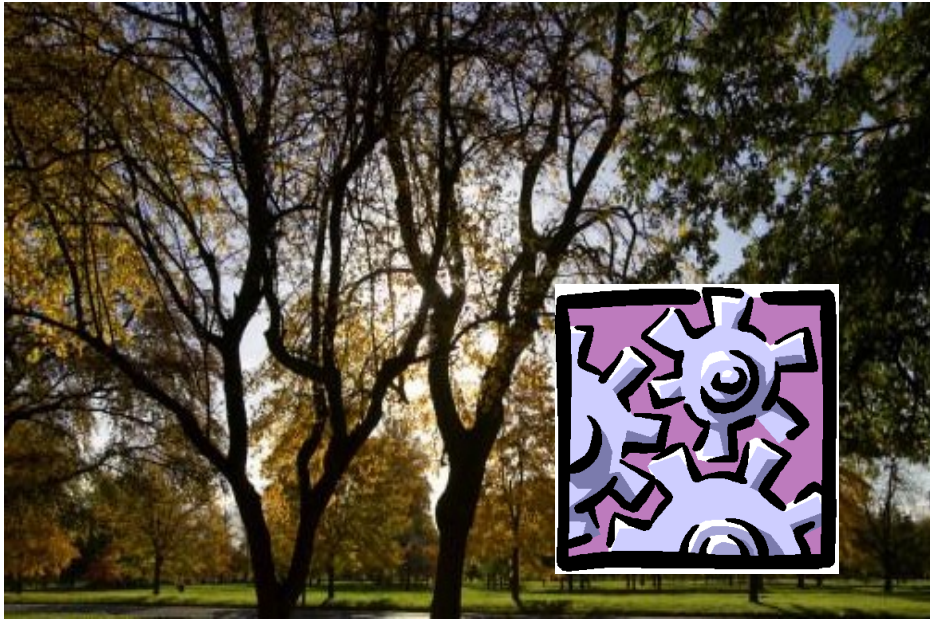
They lead to stereotypes.

For more info, look up  
"Bayesian models" and  
Josh Tenenbaum.



# “Natural” Interfaces

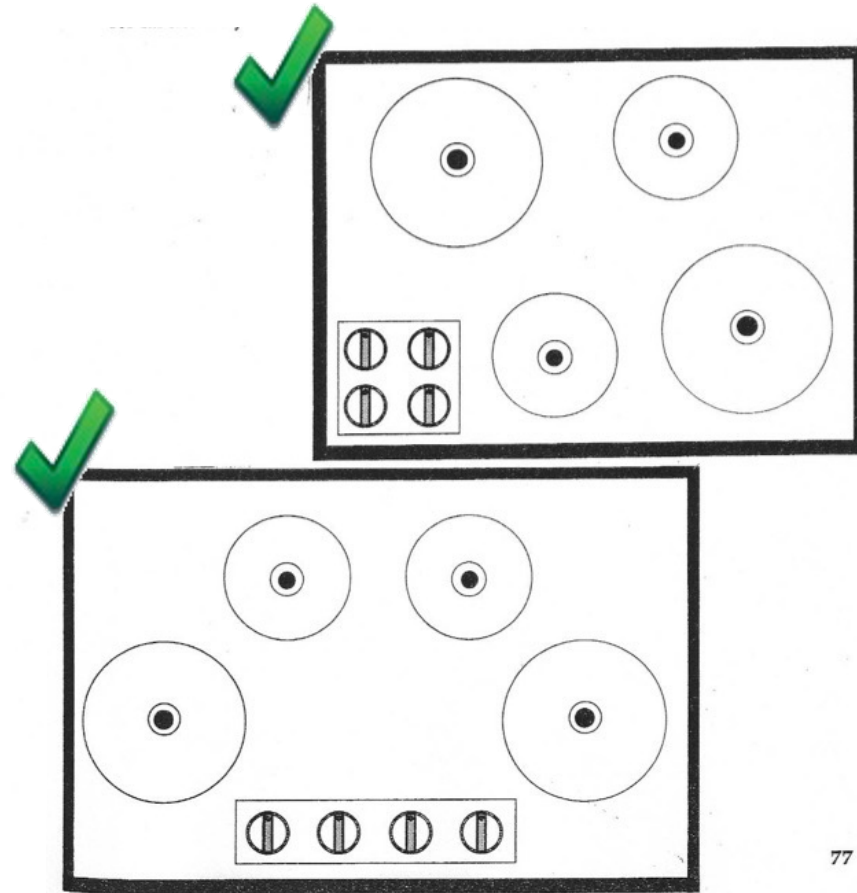
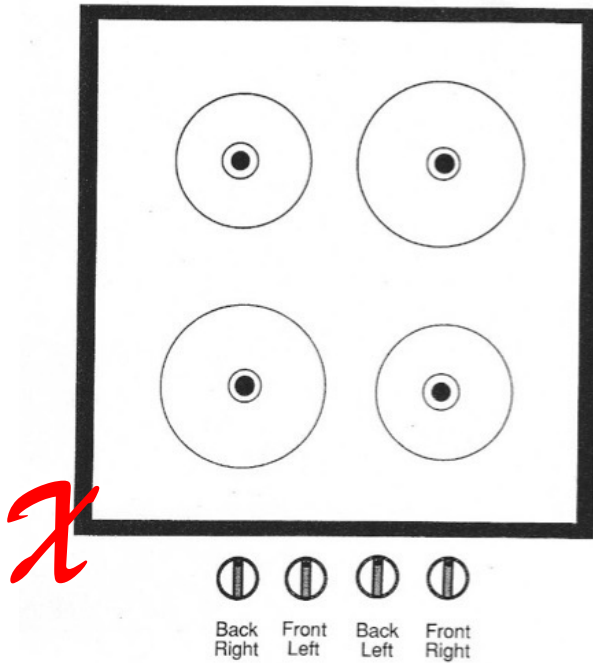
Map your learned expectations about the world onto the system's structure.



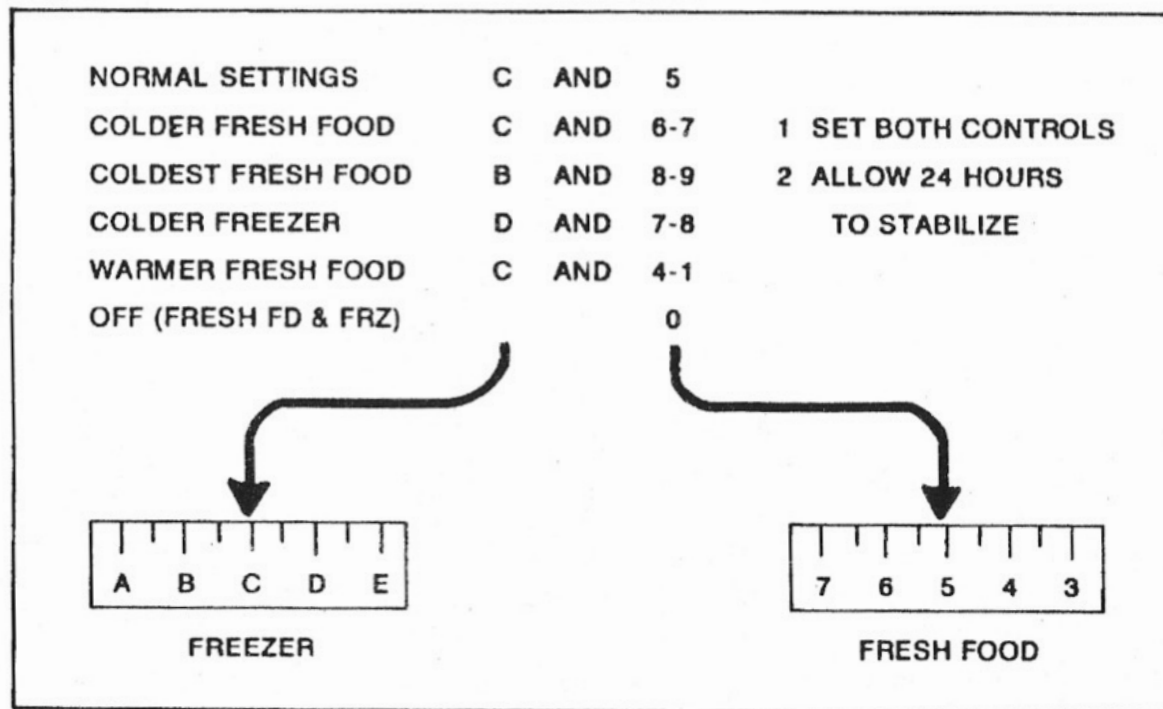
This interface doesn't violate my expectations, my natural sense of what's special.



# Natural Models



Imagine these controls are in your fridge...

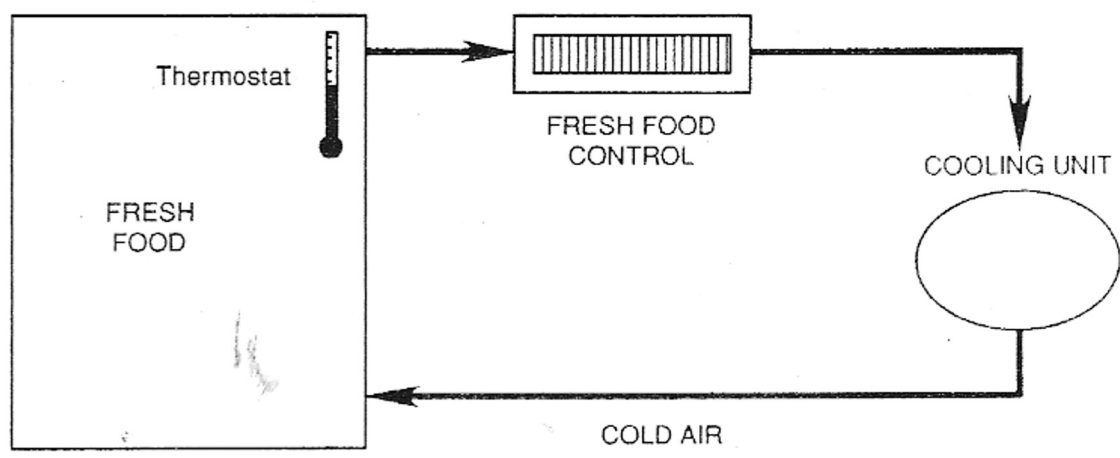
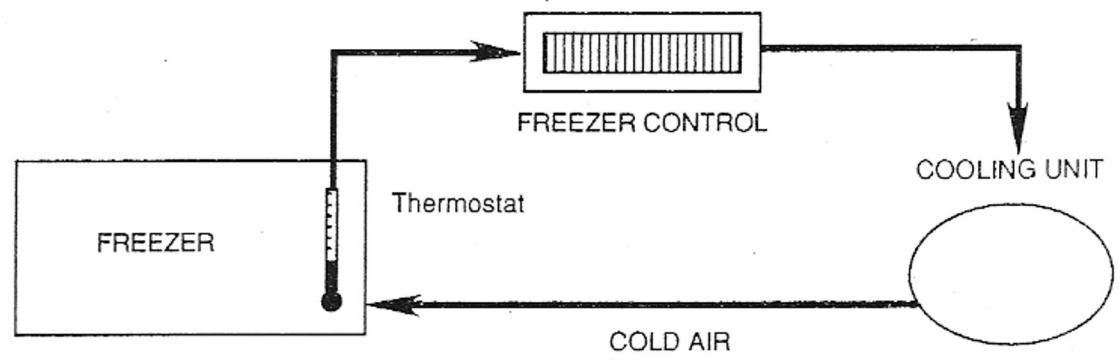


How would you make the freezer colder but keep the fresh food the same?

From *The Design of Everyday Things*, by Don Norman



# User's Hypothesized Model



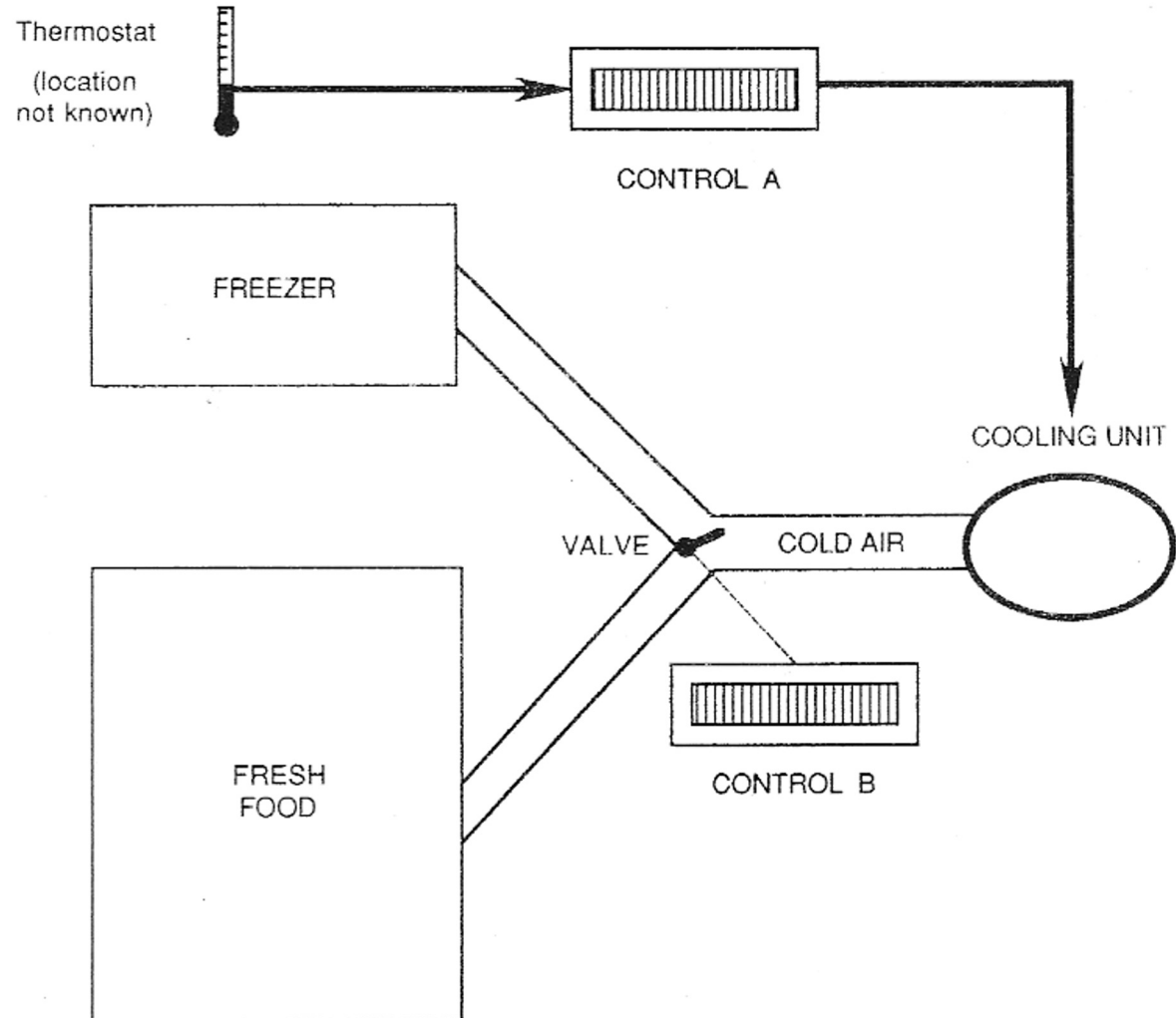
# Actual Model



Efficient Engineering



User-Centered Design



Take Home Message:

The design should match users'  
expectations.

# What are we doing this summer?

This is a job on a research team.

**Intern / Student**

It's one of the  
most creative jobs  
you'll have.



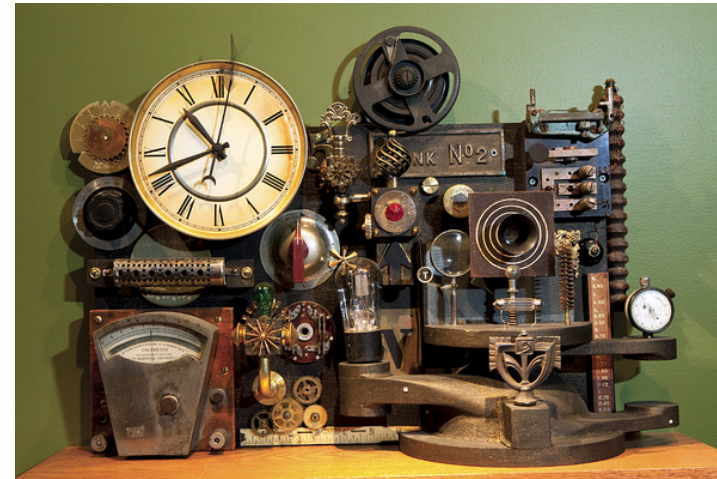
# What will you do this summer?

Create something wonderful.

Be proud of it.

**BUT**

To do the best work you possibly can, you'll probably need more than 40 hours per week.



# Themes of the REU

The nature of grad school

Teamwork

Reflection

Focused exploration

*(that's what **research** is)*

# Team Skills vs. Task Skills

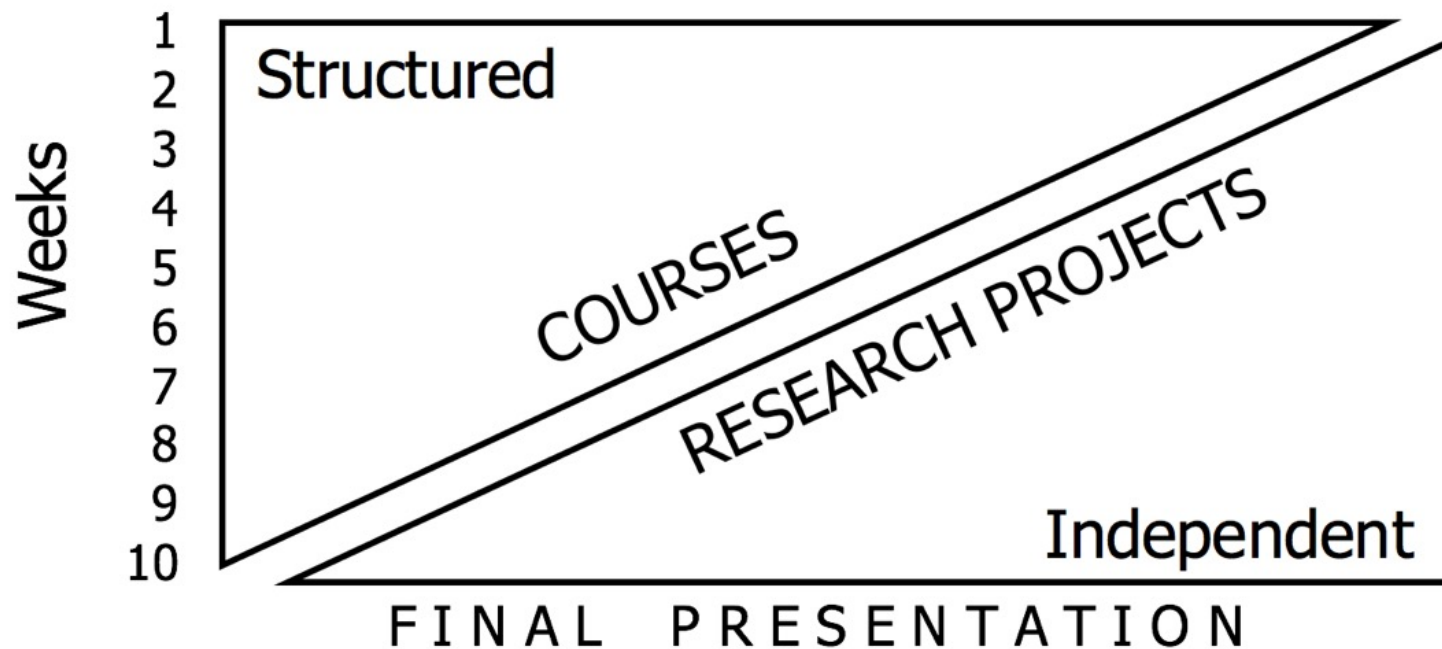
Can be hard;  
It's ok to talk  
about it.

Forming  
Storming  
Norming  
Performing



Stephen Gilbert & Eliot Winer, SPIRE III 2024

# What are we doing this summer?





# Courses / Curricular activities

Programming (C++)

Graphics programming with Unity

3D Modeling (Blender + Solidworks)

Deeper Dives

HCI (Human Computer Interaction)

Craft of Research

Journal Club

Luncheon Lectures

Ethics

How-To's: Poster, Talk, Demo

Research Symposium: Paper + Demo + Poster

*No grades...*

*Mastery Learning*

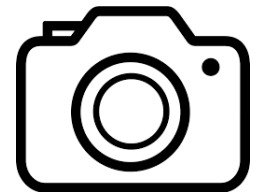
# Each week...

In VRAC lab 9-5pm (may also visit faculty member's lab)

- Classes (during earlier weeks)
- Research Team Mtg (Tue 2-3pm)
- Luncheon Lectures
- Extracurricular Activities (required Weeks 1-4)

Check / subscribe to the calendar.

Periodic [video](#) recording



# What do I do to succeed?

(What's success?)

# What do I do to succeed?

1. Participate a minimum of 40 hours per week in **program** activities
2. Participate in extracurricular activities
3. Talk with Heliya or Yvonne more than once daily
4. Meet with your grad student project mentor daily
5. Meet with your faculty member once a week
6. Give an oral mid-summer presentation
7. Post in personal blog daily
8. Research symposium: poster, demo, 5-page paper

# Blogging Daily

## What do you write about?

Your courses

Your project

What are you learning?

What are you struggling with?



From 1-1:30pm each day

Couple bullet points or narrative is fine

Comment on at least 2 others once a week

# Research Paper

- **Week 3:** Problem Area Paragraph
- **Week 4:** IRB Application Drafted
- **Week 5:** Research Question
- **Week 5:** Literature Review Paragraph
- **Week 5:** Methods Paragraph
- **Week 6:** Mid-Project Oral Presentations
- **Week 7:** Poster Draft
- **Week 8:** Research Paper Draft
- **Week 9:** Final Poster Due
- **Week 10:** Final Research Paper Due (*Be sure to include NSF required text*).

We can adapt these to your project, but you need to tell us.

# Professional work environment

9am – 5pm (call someone if sick, etc.)

Keep noise to a dull roar

Pods, Albaugh Conf Room, JB Conf Room,

Little social media (non-work computing)

No profanity, please

Consider diverse group

*Use words like, “Do you mean ...?”*



# Who can help me?

## REU Staff

**Stephen Gilbert & Eliot Winer**, CoPIs

**Sarah Pippin**, Program Coordinator

**Heliya Ahmadi**, Cross-REU Mentor

**Yvonne Farah**, Cross-REU Mentor

Grad Students & Faculty Mentors

Course Instructors

Tech Support, [reuhelp@vrac.iastate.edu](mailto:reuhelp@vrac.iastate.edu)

## Research Team

Faculty Member

Grad Student(s)

Fellow Interns



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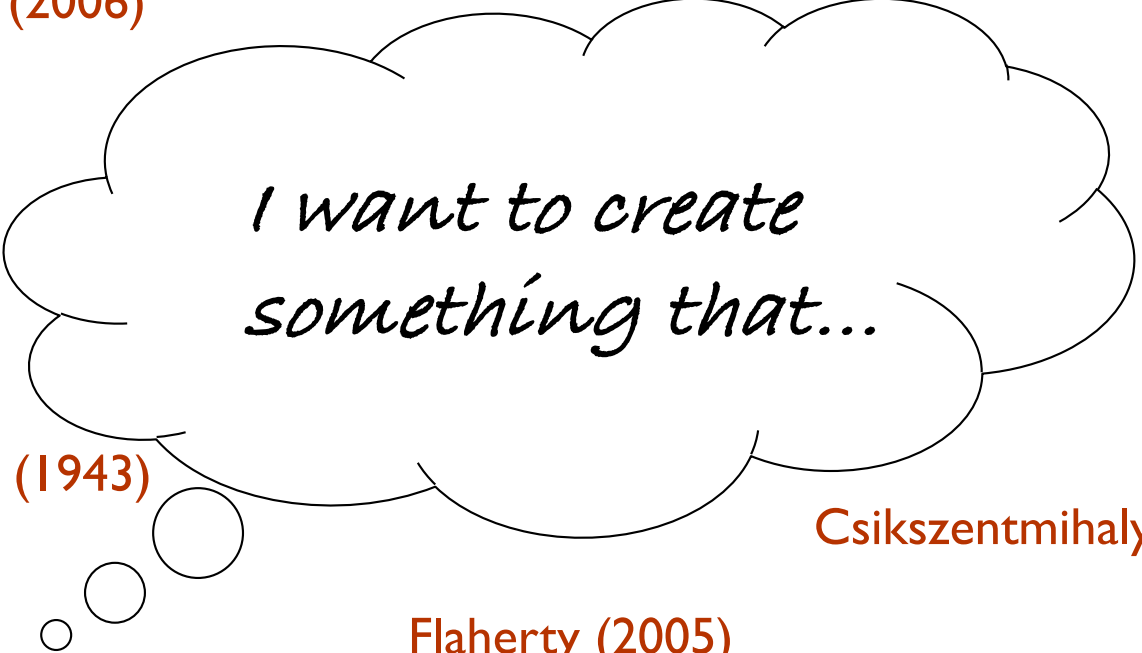
What's HCI?

Spaghetti & Marshmallows

**Stretch & Alphabetize  
by First Name!**

Sawyer (2006)

Heuscher (2003)



*I want to create  
something that...*

Maslow (1943)

Csikszentmihalyi (1996)

Flaherty (2005)

Ryan &  
Deci  
(2000)

*I want to  
help people...*

Piliavan &  
Charng  
(1990)







Stephen Gilbert & Eliot Winer, SPIRE-EIT 202

Another example...

## Spanish train crash in 2013



Click pic to launch  
YouTube video



Your company built that train.



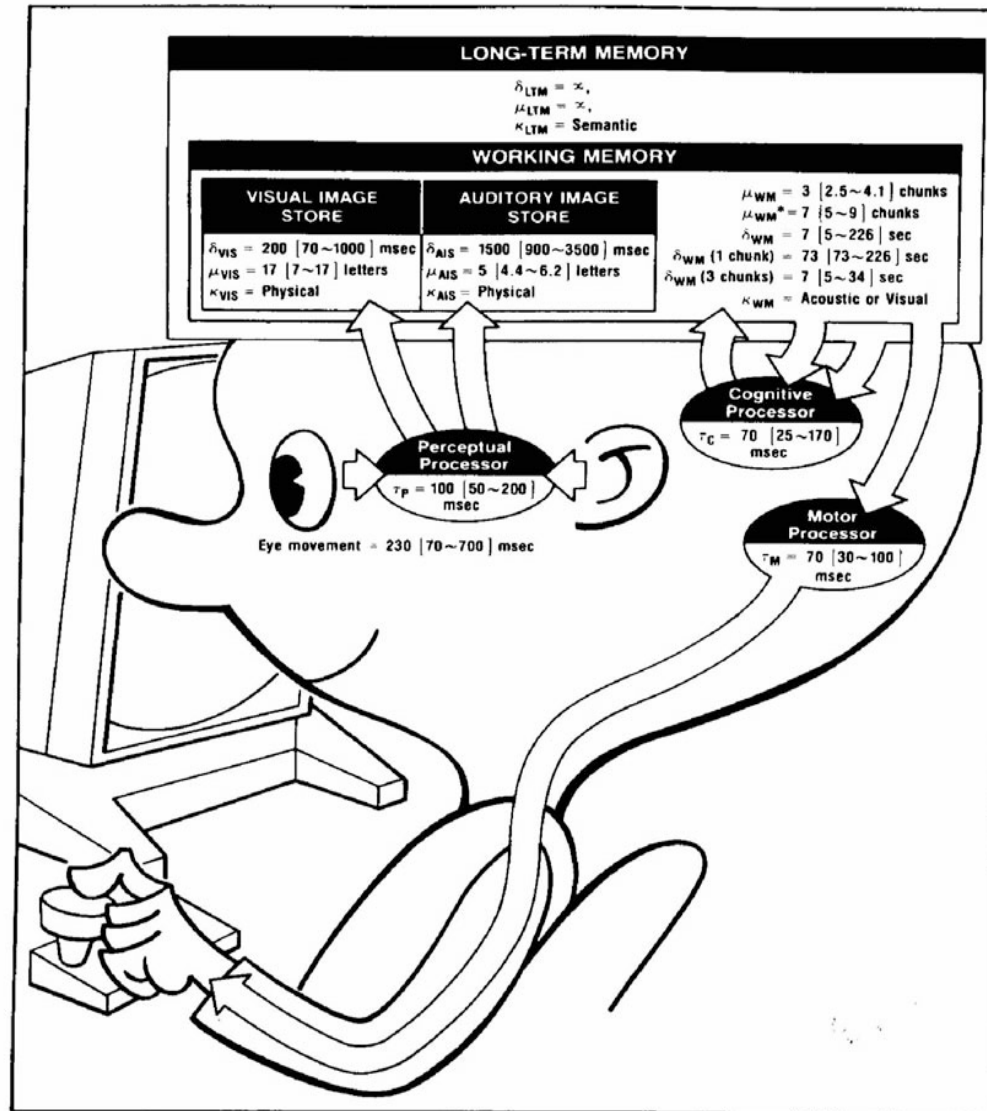
The Spanish Transport Authority is  
conducting an inquiry.

What questions will they ask?

Train:  
121 mph

Human:  
~500 ms  
reaction time

You just  
travelled  
88 feet.



Card, Moran, &  
Newell, 1986

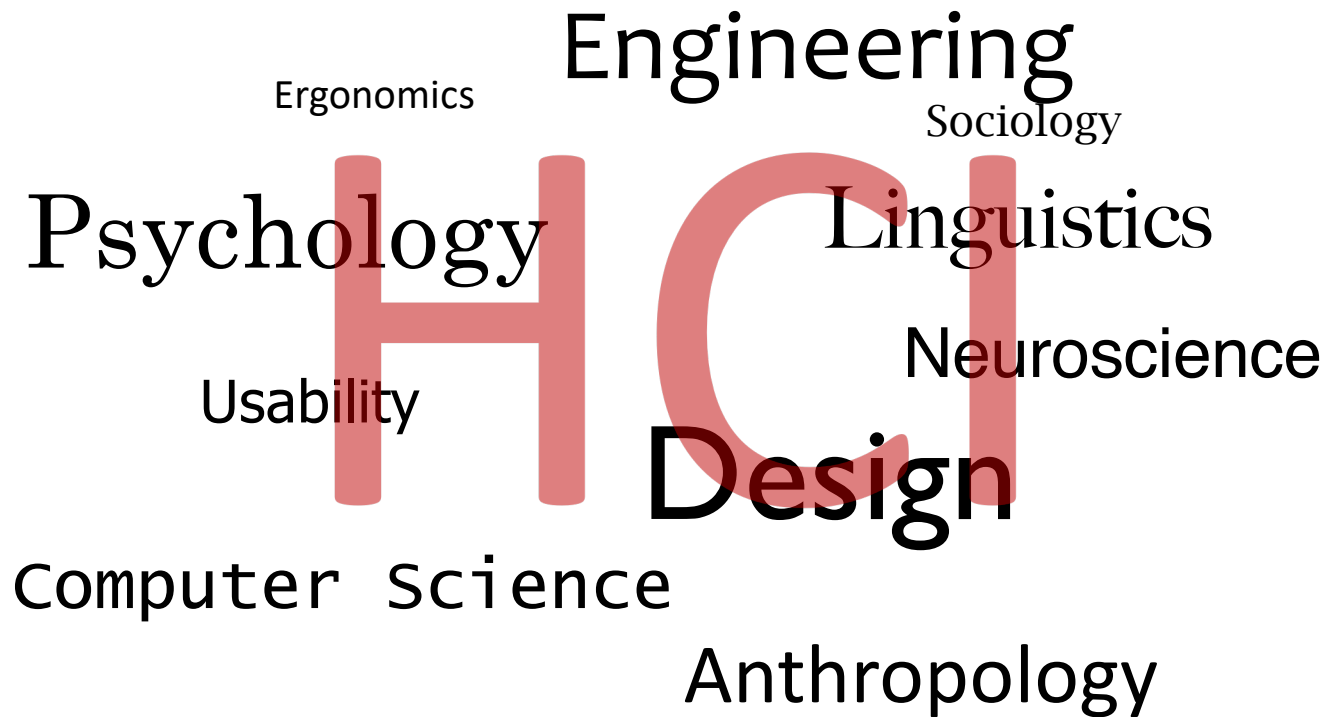
# Spanish Train Crash

<http://www.abc.net.au/news/2013-07-31/black-box-recordings-reveal-spain-train-driver-on-phone/4854804>

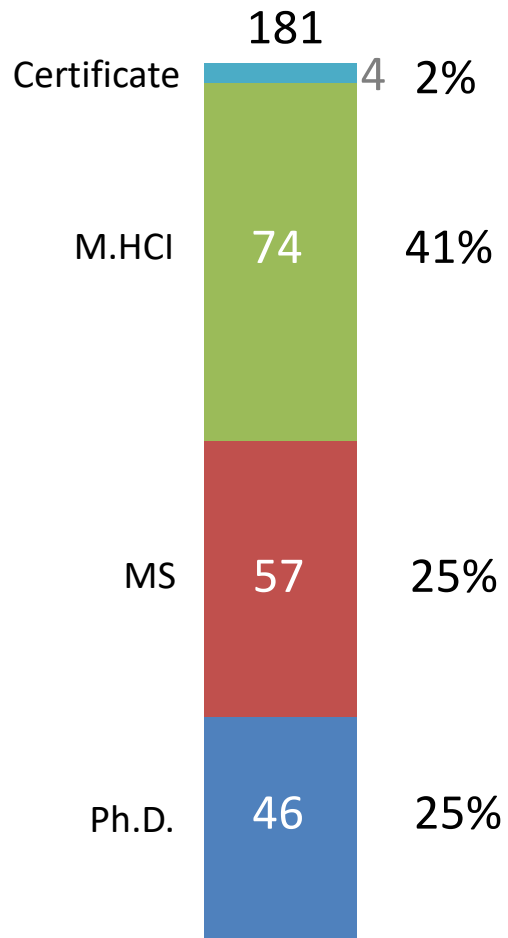
<http://www.theguardian.com/world/2013/aug/02/spanish-train-crash-driver-warnings>

[http://www.reddit.com/r/videos/comments/1j0r6p/video\\_of\\_spanish\\_train\\_derailing/](http://www.reddit.com/r/videos/comments/1j0r6p/video_of_spanish_train_derailing/)

[https://en.wikipedia.org/wiki/Santiago\\_de\\_Compostela\\_rail\\_disaster](https://en.wikipedia.org/wiki/Santiago_de_Compostela_rail_disaster)



Spring  
2024



12% Underrepresented race/ethnicity  
66% Female  
40% International  
Faculty in 5 ISU colleges

Typical HCI Jobs

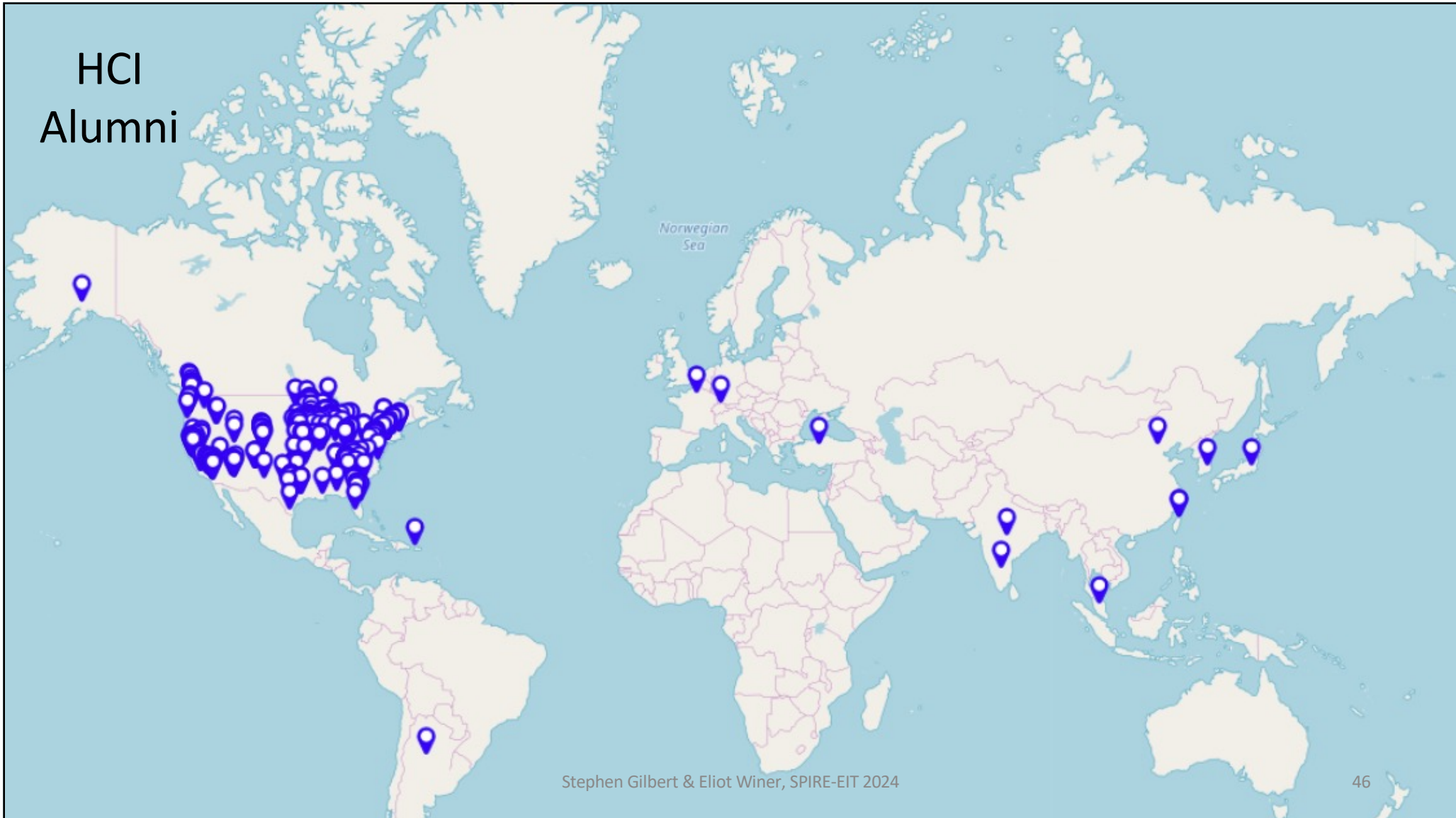


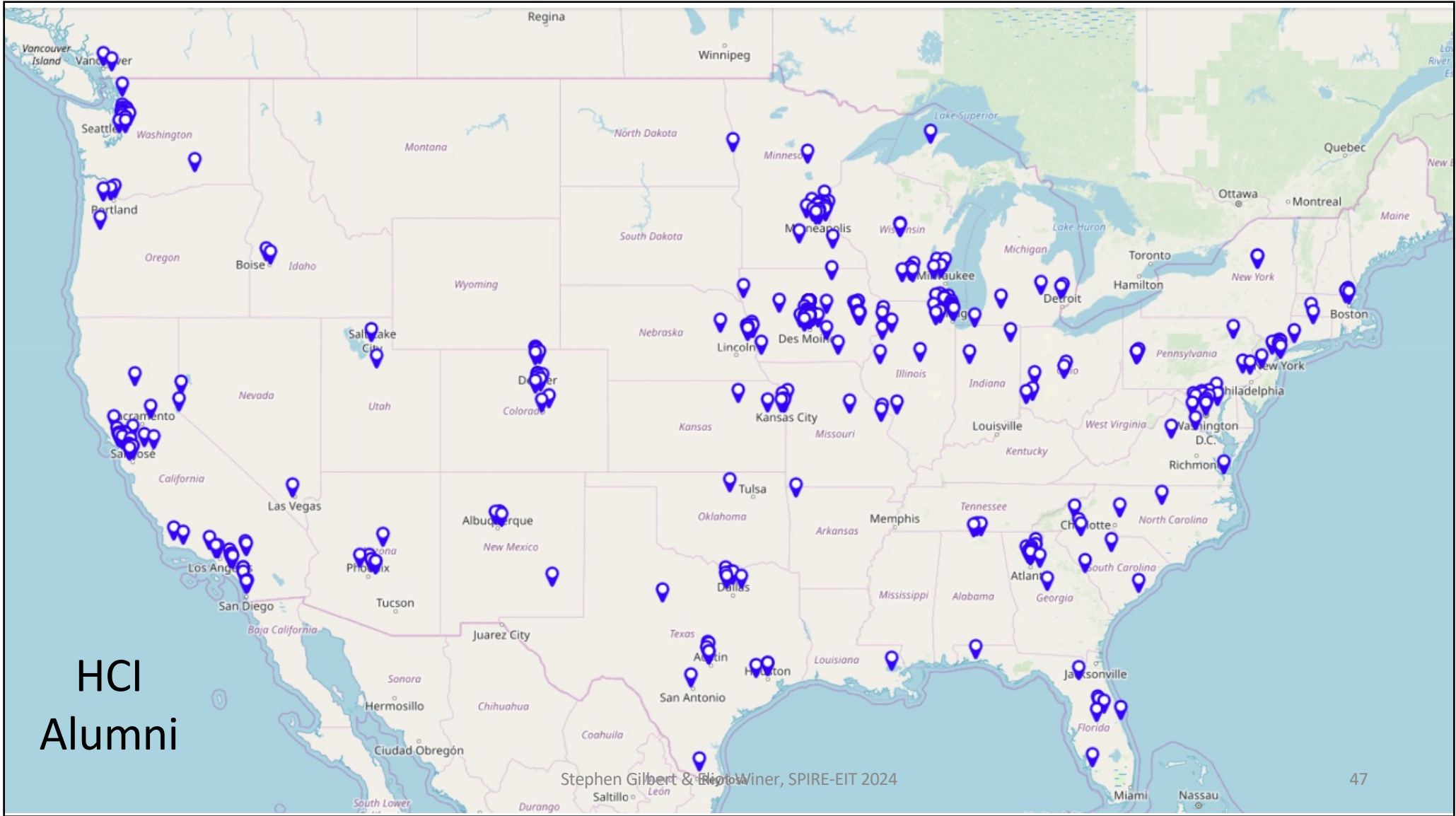
Data Analyst  
Data Scientist  
Software Developer  
Product Designer  
Product Manager



Marketing Strategist  
User Experience (UX) Designer  
UX Researcher  
User Interface Designer  
Interaction Designer

# HCI Alumni





# HCI Alumni

Stephen Gilbert & Rip Winer, SPIRE-EIT 2024





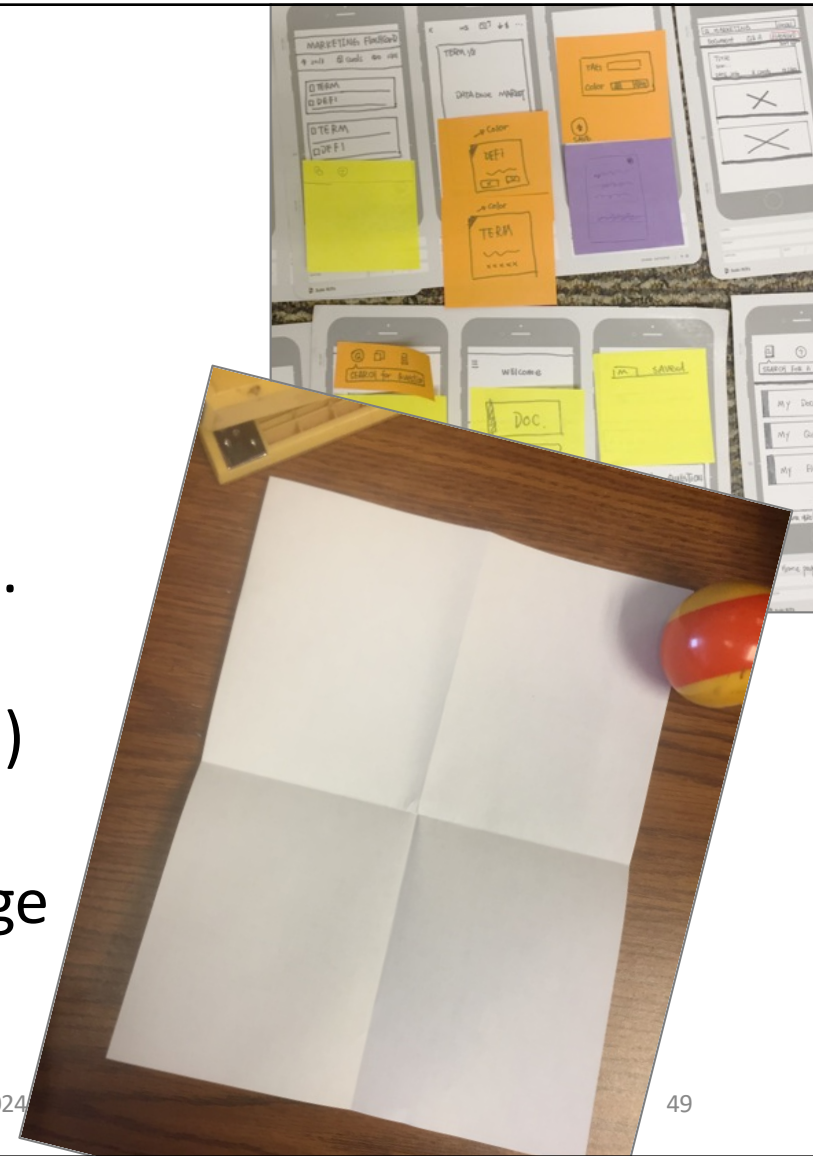
# Rapid Prototyping Activity

Take a sheet of paper and fold it in quarters. Each quarter is an app screen.

Count off 1-4 and receive App Challenge.

Sketch some screens of the app. (10 min)

Join other person who had your challenge & compare. (5 min)



# App Challenges

1. Design an app to track your cat in your home while you're away.
2. Design an app to help you choose the perfect gift for someone.
3. Design an app that says if you're well dressed from a selfie.
4. Design an app that helps you break a negative habit or start a positive habit.

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Spaghetti & Marshmallows

# Build a Tower

- You have spaghetti & marshmallows.  
The highest thing on your tower must be 2 marshmallows.
- 8 minutes

Reflect on:

- Leadership
- Conflict resolution
- [TED Video](#) on tower building

