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
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
...

Stephen Gilbert & Eliot Winer, SPIRE-EIT 2024
Stakeholders in a Design
Stakeholders in the REU Design

- NSF
- ISU
- You
- VRAC
- Faculty
- Grad Ss
- Lab Users
- VRAC IT
- Staff
- Friends
- Parents
- Employers
Emerging Interface Technologies
“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.

Typical:

Sometimes:

Rare:

Special:
Straight
Round
Alignment
Endpoints
Middleness
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

Back Right  Front Left  Back Left  Front Right

Stephen Gilbert & Eliot Winer, SPIRE-EIT 2024
Imagine these controls are in your fridge...

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

How would you make the freezer colder but keep the fresh food the same?
User's Hypothesized Model

Diagram showing a thermostat controlling a freezer and a fresh food compartment, with a cooling unit providing cold air.
Actual Model

Efficient Engineering

User-Centered Design

Thermostat (location not known)

CONTROL A

FREEZER

COOLING UNIT

VALVE

COLD AIR

FRESH FOOD

CONTROL B

Stephen Gilbert & Eliot Winer, SPIRE-EIT 2024
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
What are we doing this summer?

- **Weeks**: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
- **Structured**: Courses, Research Projects
- **Independent**: Final Presentation
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
We can adapt these to your project, but you need to tell us.

- **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)*
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

**Research Team**
Faculty Member
Grad Student(s)
Fellow Interns

Stephen Gilbert & Eliot Winer, SPIRE-EIT 2024
Outline

✓ Why are you here?
✓ What's an REU? What's this REU?
   What's HCI?
Spaghetti & Marshmallows

Stretch & Alphabetize by First Name!
I want to create something that...

Sawyer (2006)  
Maslow (1943)  
Flaherty (2005)  
Heuscher (2003)  
Csikszentmihalyi (1996)  
Maslow (1943)
I want to help people...

Ryan & Deci (2000)

Piliavan & Charng (1990)
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.theguardian.com/world/2013/aug/02/spanish-train-crash-driver-warnings

http://www.reddit.com/r/videos/comments/1j0r6p/video_of_spanish_train_derailing/

https://en.wikipedia.org/wiki/Santiago_de_Compostela_rail_disaster
HCI

Ergonomics
Psychology
Usability
Computer Science
Design
Engineering
Sociology
Linguistics
Neuroscience
Anthropology
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

---

**Spring 2024**

- Certificate: 181 (2%)
- M.HCI: 74 (41%)
- MS: 57 (25%)
- Ph.D.: 46 (25%)
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.
Outline

- Why are you here?
- What's an REU? What's this REU?
- What's HCI?

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