CSE518 Foundations of Human Computer Interaction

Lecture 1 Introduction

Xiaojun Bi

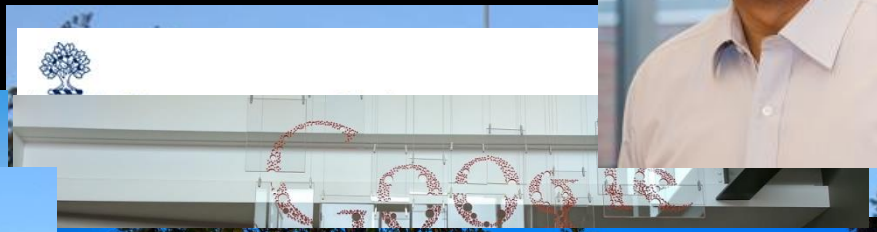
Stony Brook University

xiaojun@cs.stonybrook.edu

8/27/2019

My Background

About Myself



Agenda

- **HCI & Some Frontiers**
- Course Goals
- Administrivia
- Instructor's HCI research (1/2)

Human Computer Interaction

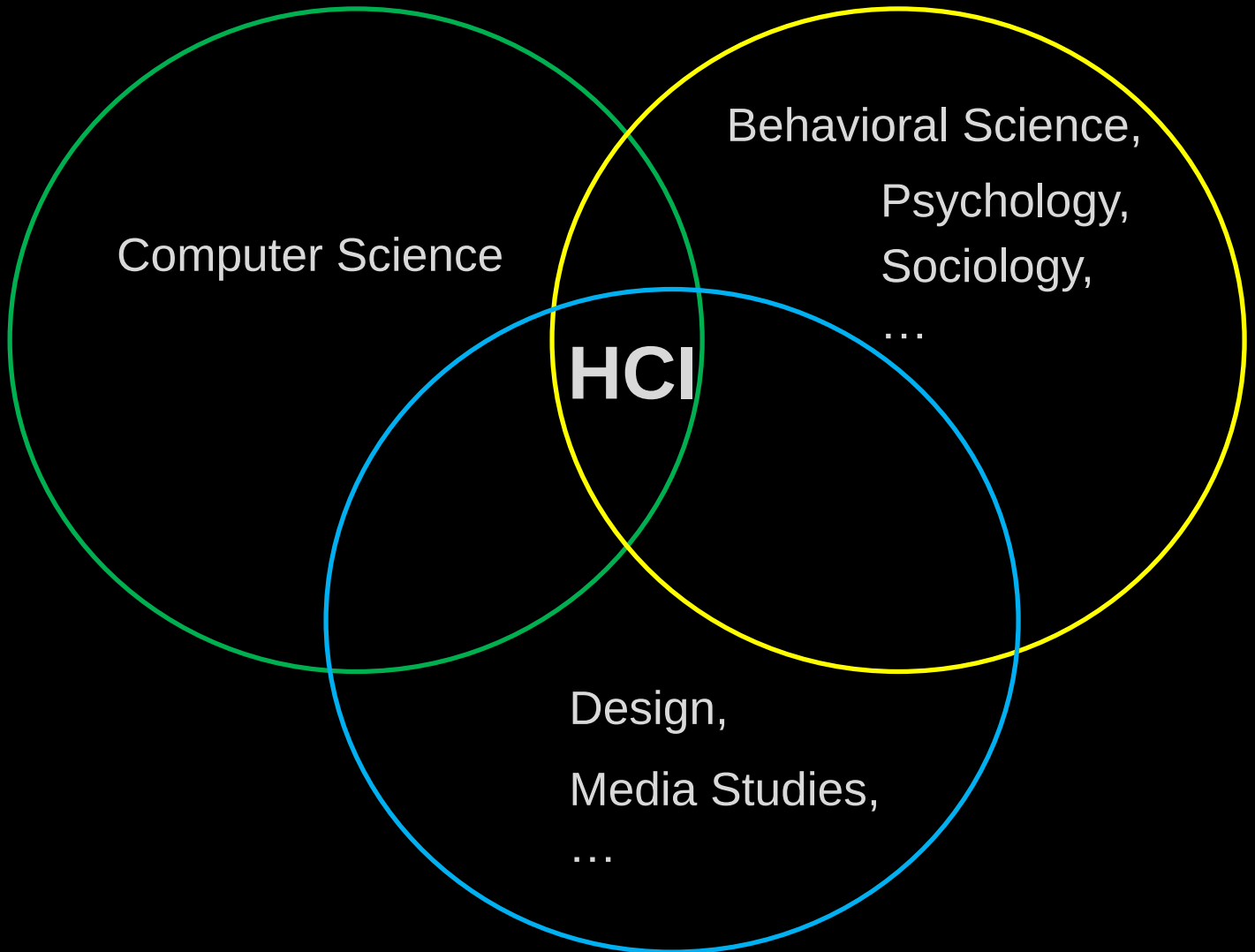
- What is Human Computer Interaction (HCI)?

A discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.

ACM SIGCHI Curricula for Human-Computer Interaction
by Hewett, Baecker, Card, Carey, Gasen, Mantei, Perlman, Strong and Verplank
http://old.sigchi.org/cdg/cdg2.html (access 2018)

Human Computer Interaction

- What is Human Computer Interaction (HCI)?



Recent Examples

facebook

twitter

Example 1. ShapeWriting Technique

Per-Ola Kristensson and Shumin Zhai. 2004.
SHARK2: a large vocabulary shorthand writing system for pen-based computers. (UIST '04), 43-52.

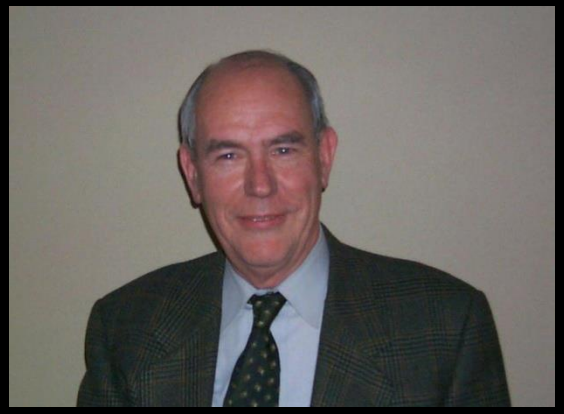
Example 2. Mobile Sensing Techniques

Ken Hinckley, Jeff Pierce, Mike Sinclair, and Eric Horvitz. 2000.
Sensing techniques for mobile interaction (UIST '00). 91-100.

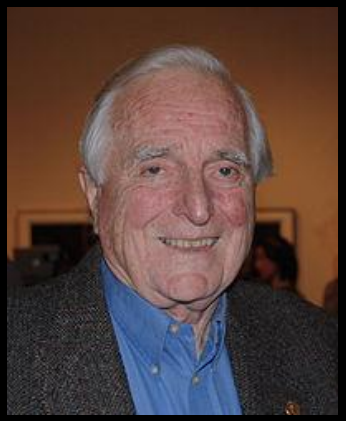
Example 3. Tangible User Interface

Brygg Ullmer and Hiroshi Ishii. 1997.
The metaDESK: models and prototypes for tangible user interfaces. (UIST '97). 223-232.

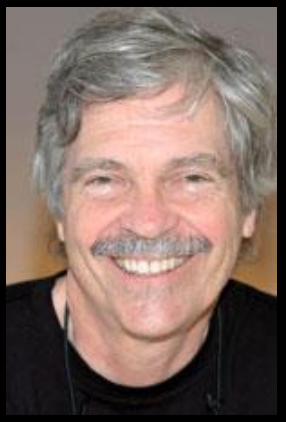
Turing Award Laureates in HCI



Ivan Sutherland



Doug Engelbart



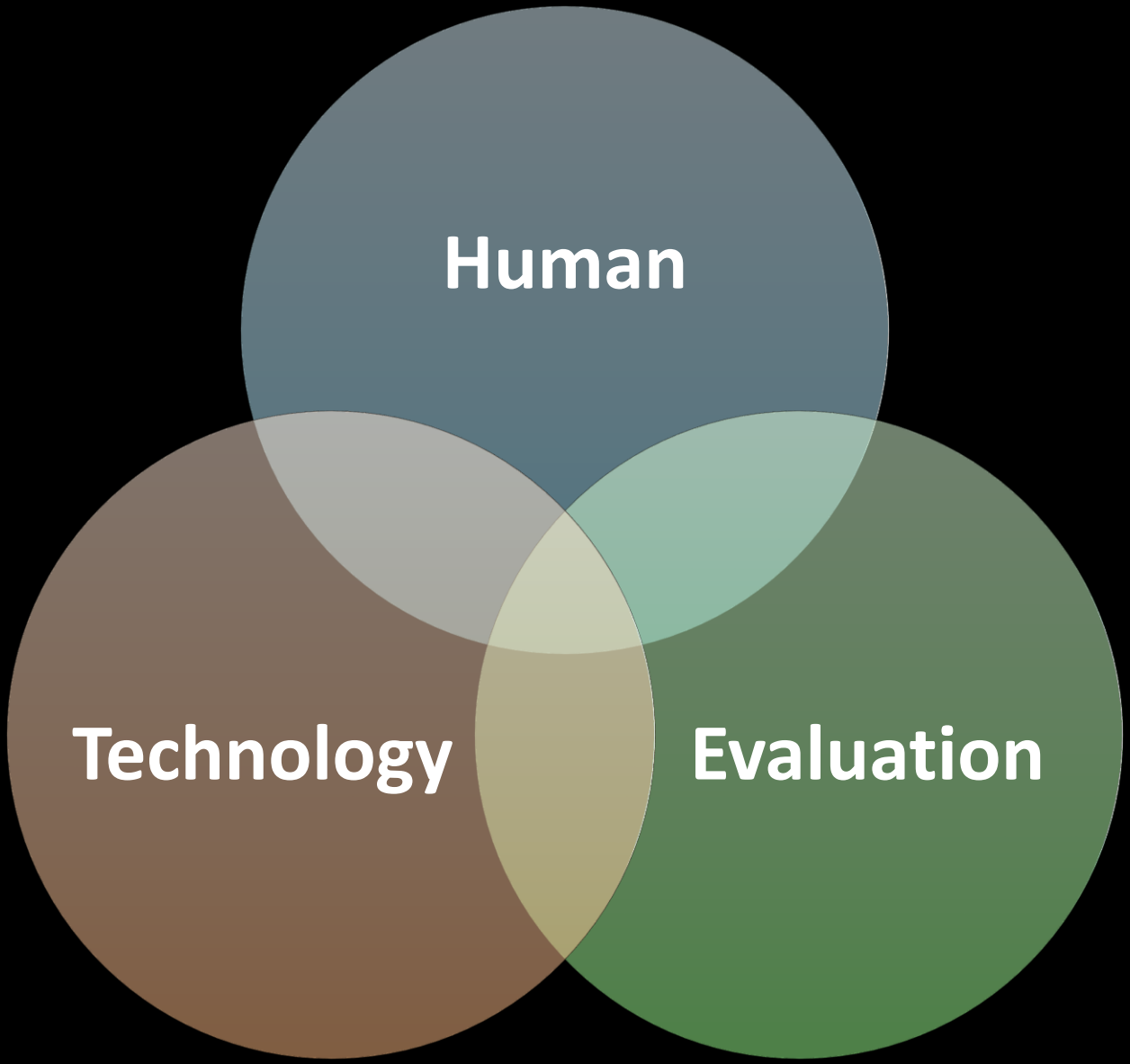
Alan Kay

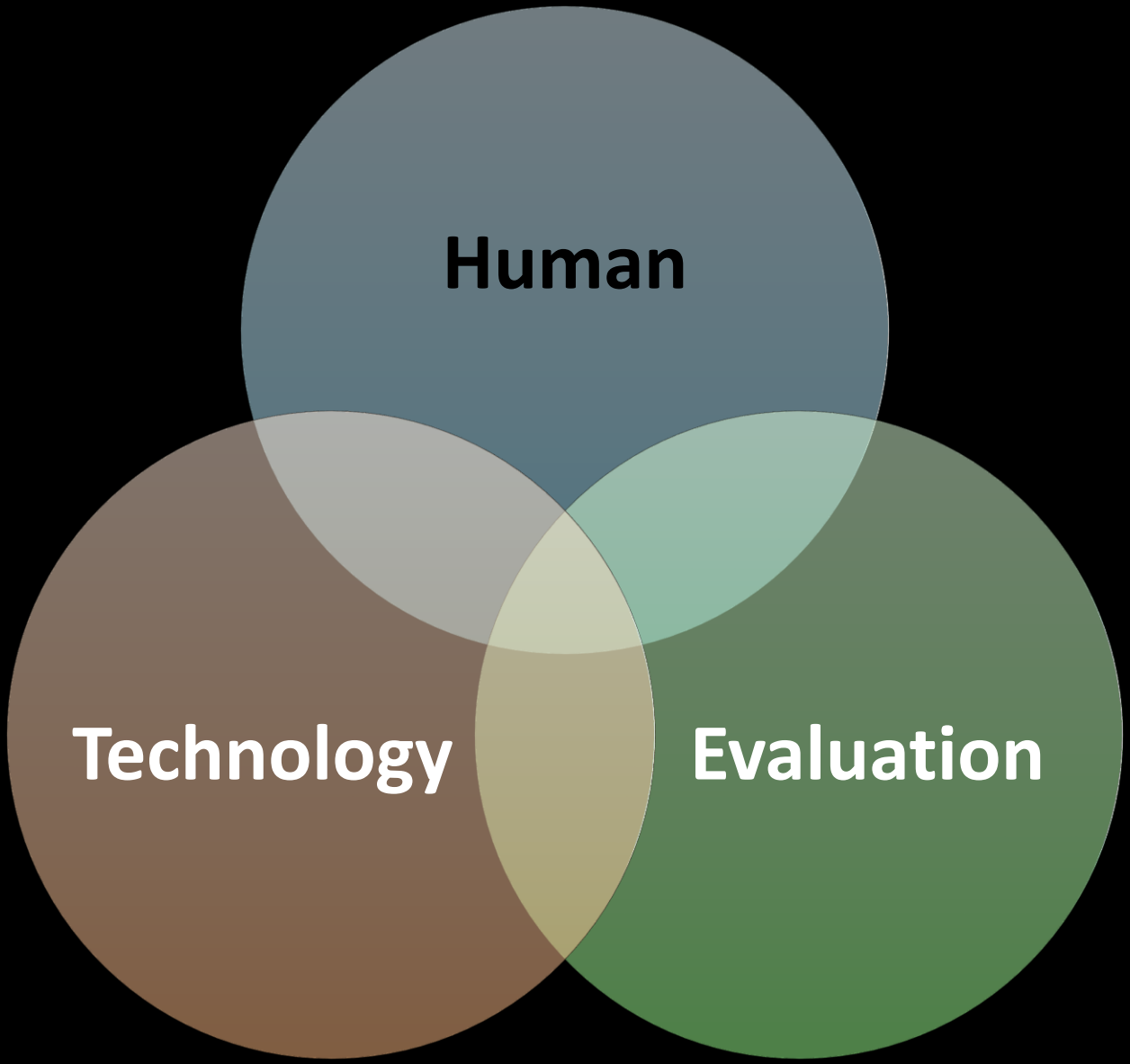
Butler Lampson

Allen Newell

Herbert Simon

Why Study HCI?

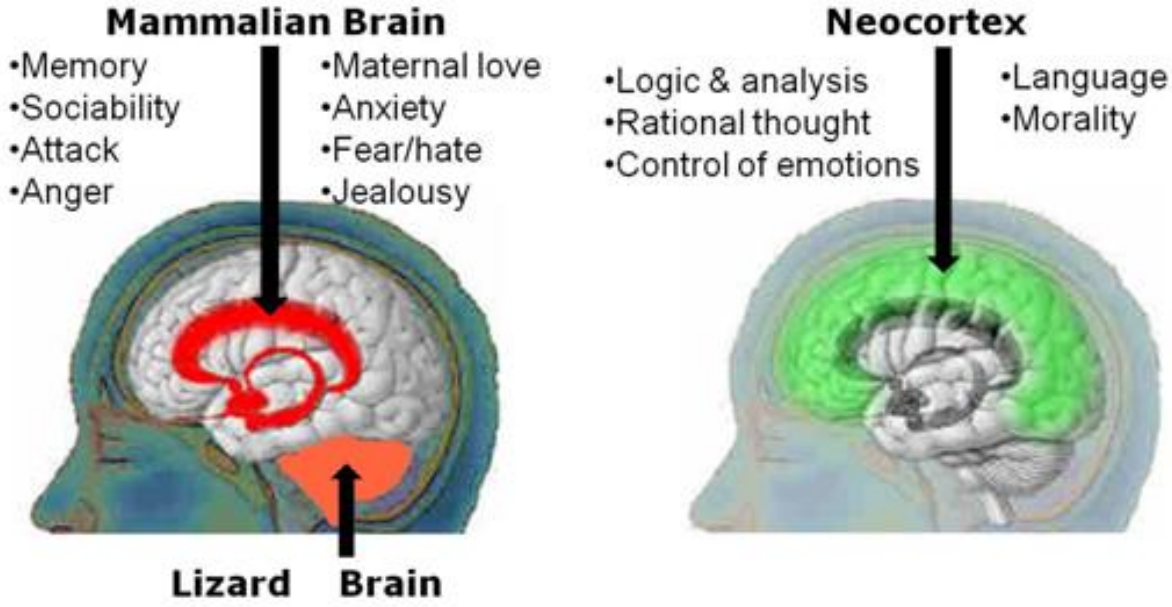

Human
Technology
Evaluation


Human
Technology
Evaluation

Human does not behave like a machine.

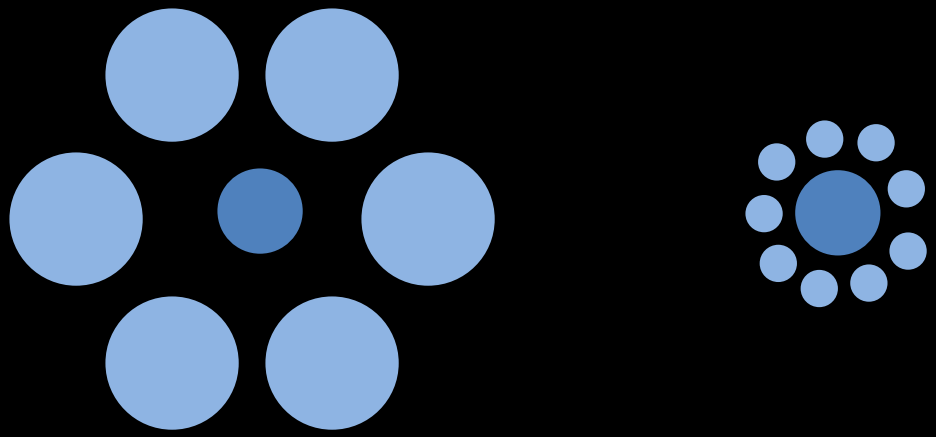
The Dual System Hypothesis

- System 1 is the "old brain" also called the back brain or mammalian brain. This is the automatic brain of fight or flight, intuition, emotion, and instinct.
- System 2 is the neocortex or "new brain" and evolved only relatively recently. It contains language, cognition, memory, planning and the "executive function" – the ability to make decisions based on data.

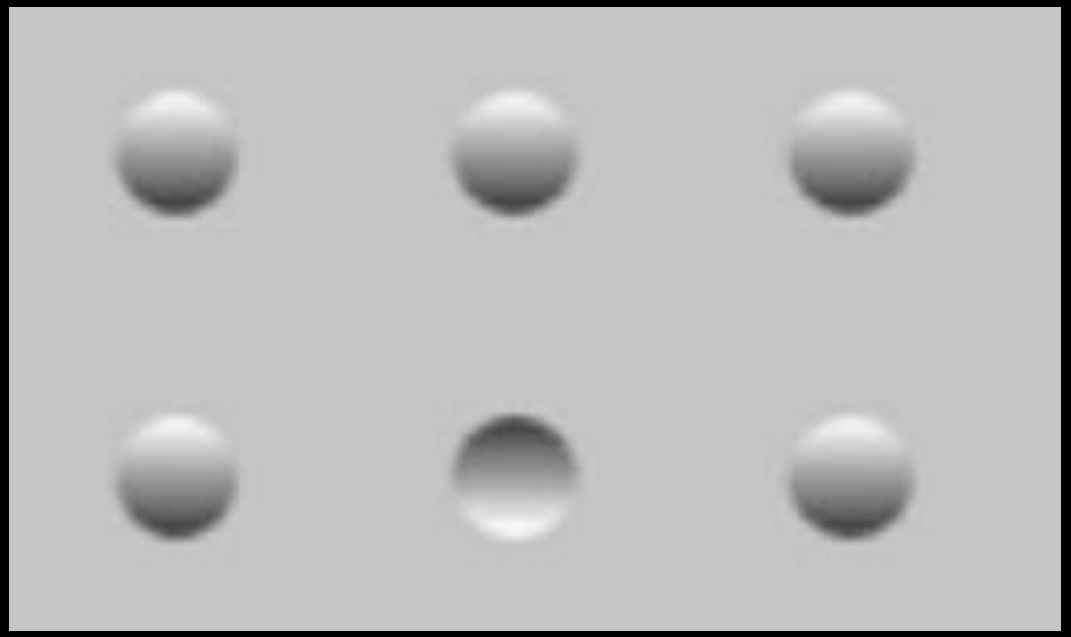


Why Our Perception System is Biased

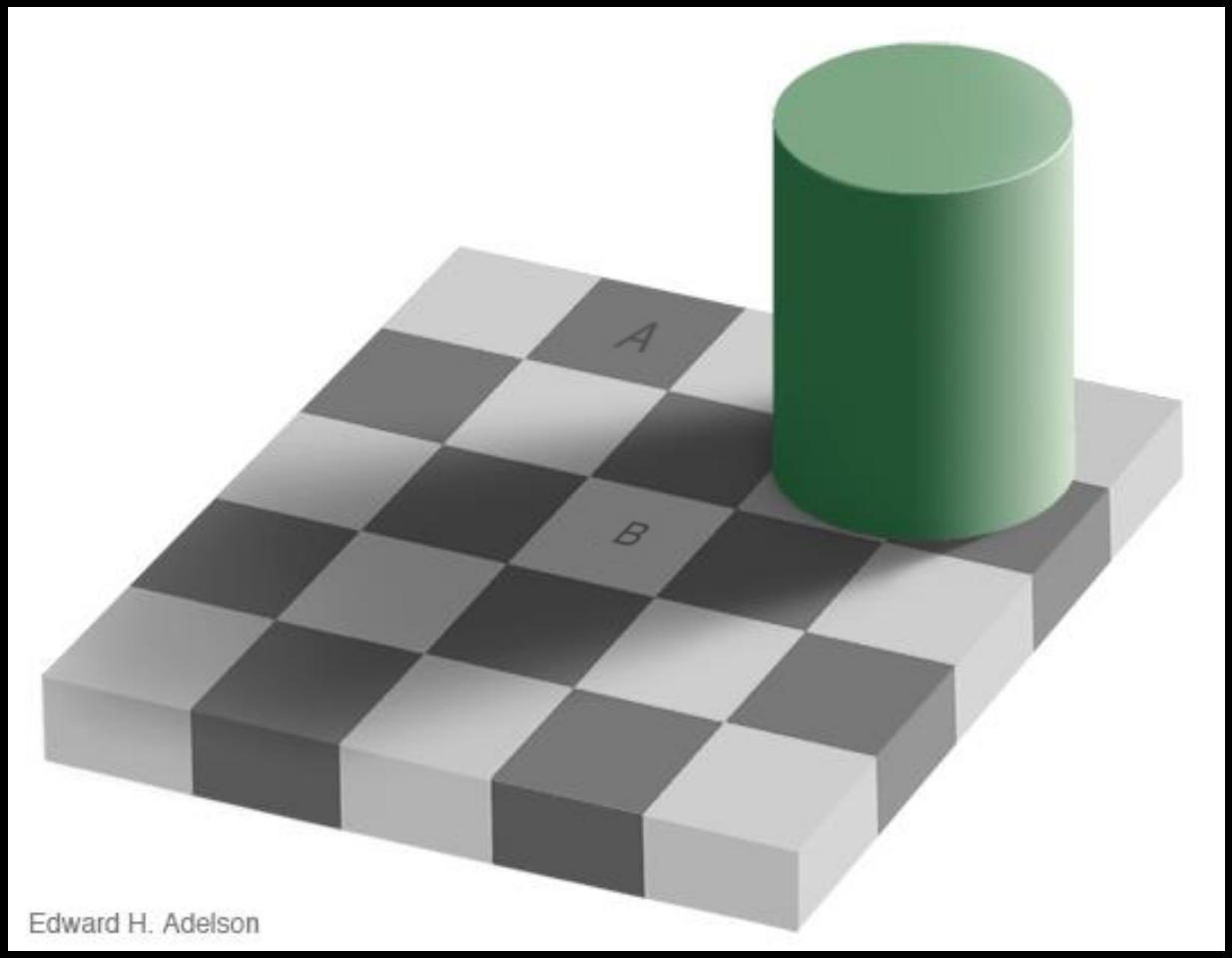
Which Circle is Bigger?



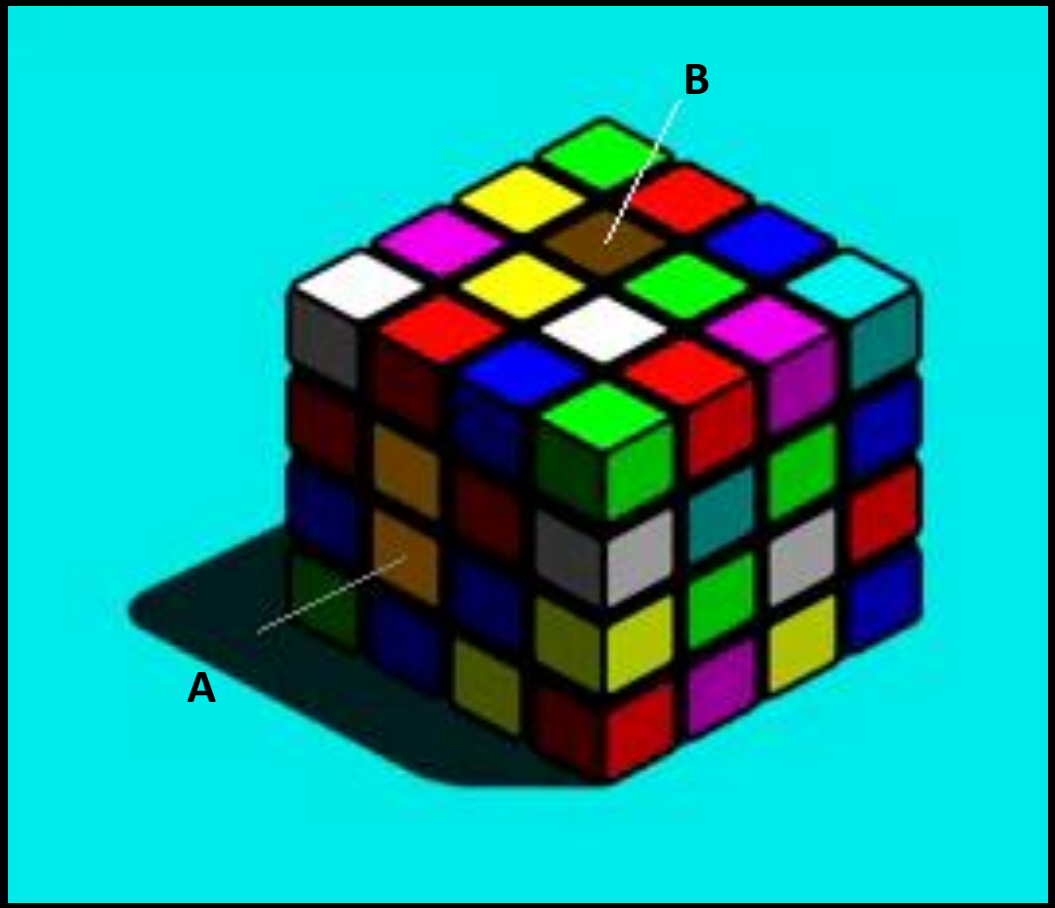
How Many Convex Circles?



Which Region is Darker?



What Are The Colors?



Why Our Decision System is Biased

Loss Aversion and Uncertainty Aversion

50% chance of losing $200

100% chance of losing $100

Loss Aversion and Uncertainty Aversion

50% chance of winning $200	100% chance of winning $100

Loss Aversion and Uncertainty Aversion

50% chance of losing $200	100% chance of losing $100	50% chance of winning $200	100% chance of winning $100

Confirmation Bias

- Instead of making informed decisions, people tend to search for, interpret, or recall information in a way that confirms their beliefs or hypotheses.
  - Biased search for information
  - Biased interpretation
  - Biased memory

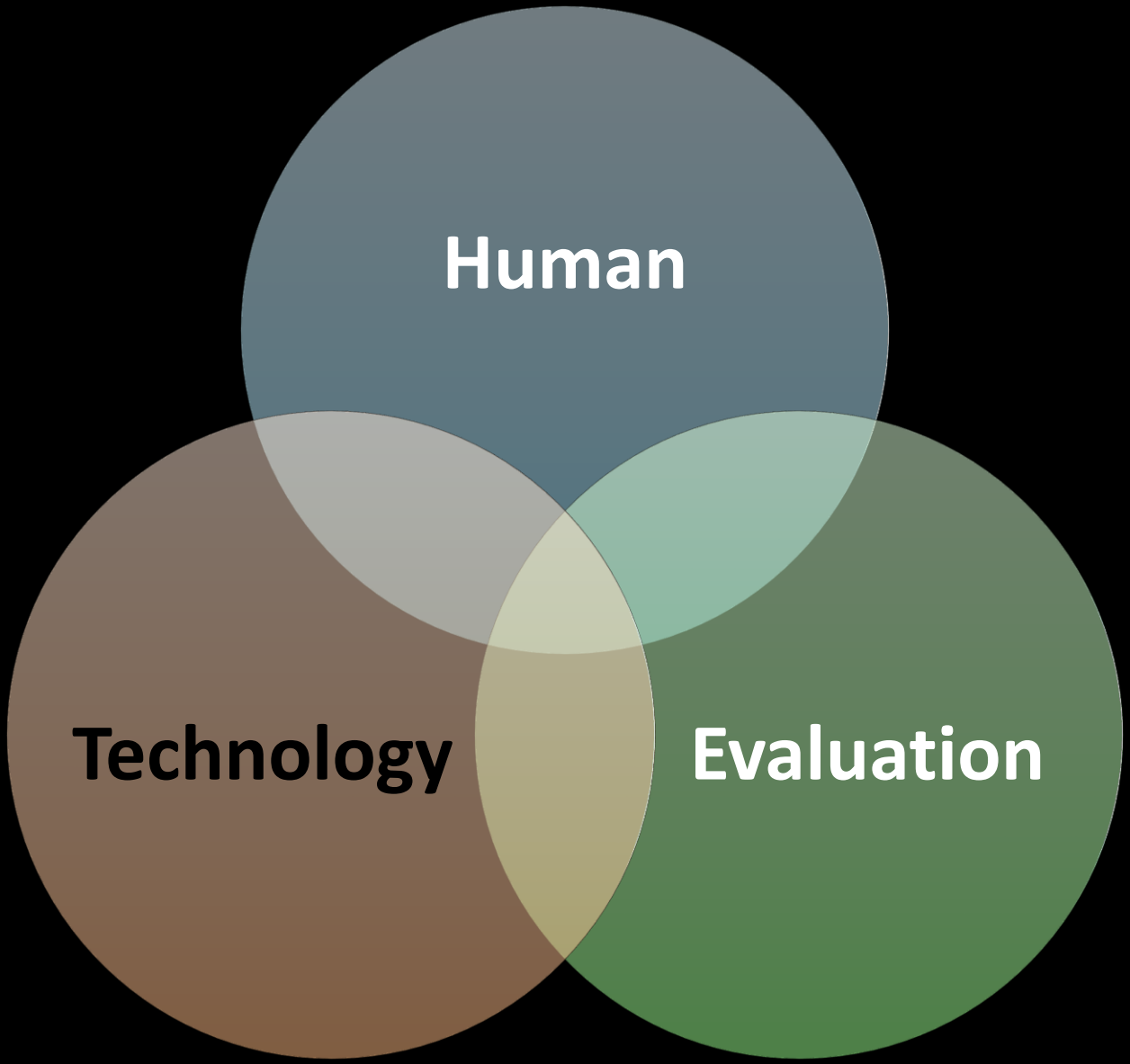
Example 1. How does a doctor make a diagnosis? (Groopman 2007)
Example 2. Job Interview

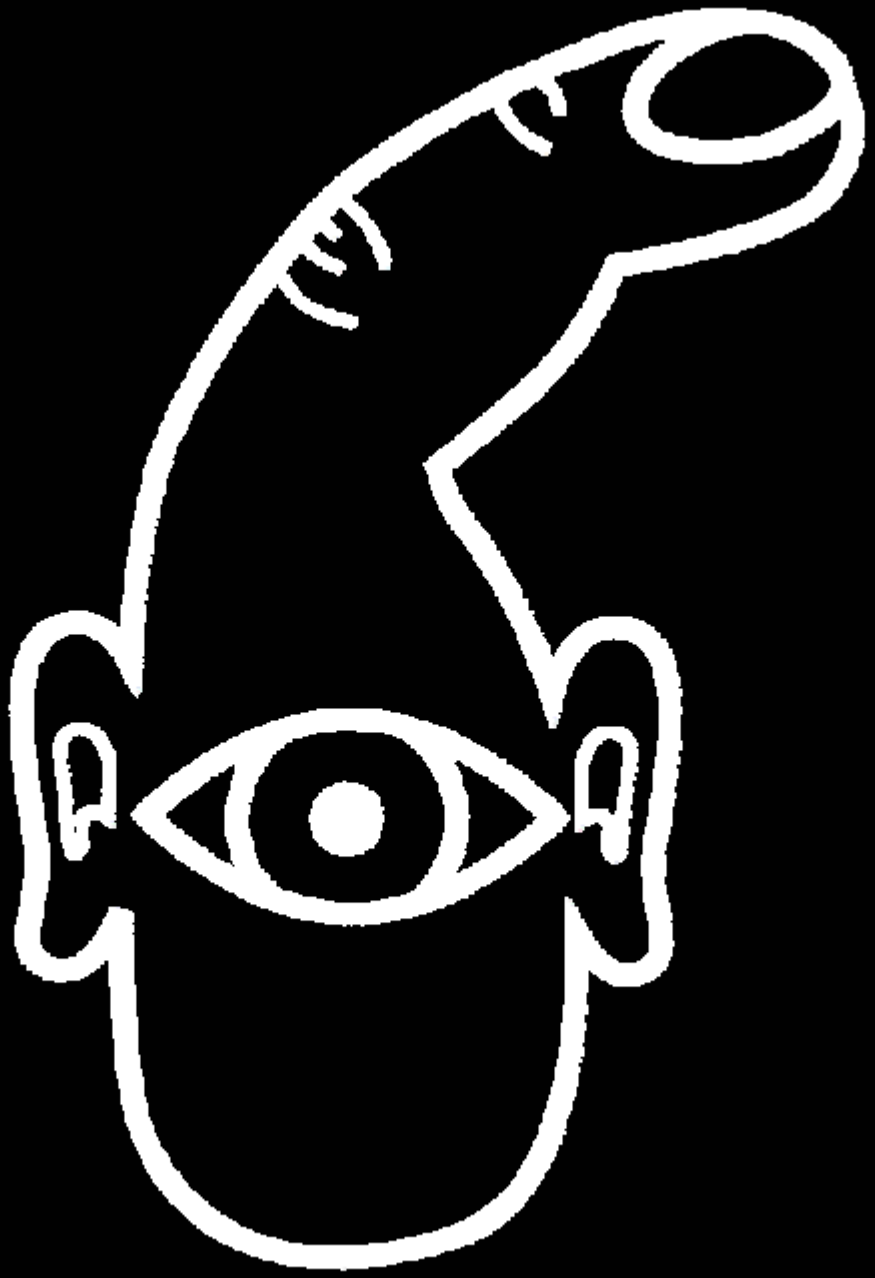
Peak-end Effect

- **Peak-End Rule**
  - The most intensive (peak) and ending moments play a dominant role

Superiority Bias

- 87% of MBA students at Stanford University rated their academic performance as above the median.
- In a survey of faculty at the University of Nebraska, 68% rated themselves in the top 25% for teaching ability.
- In a survey by the College Board in the USA in 1976, In ability to get on well with others, 85% put themselves above the median, and 25% rated themselves in the top 1%.


Human
Technology
Evaluation



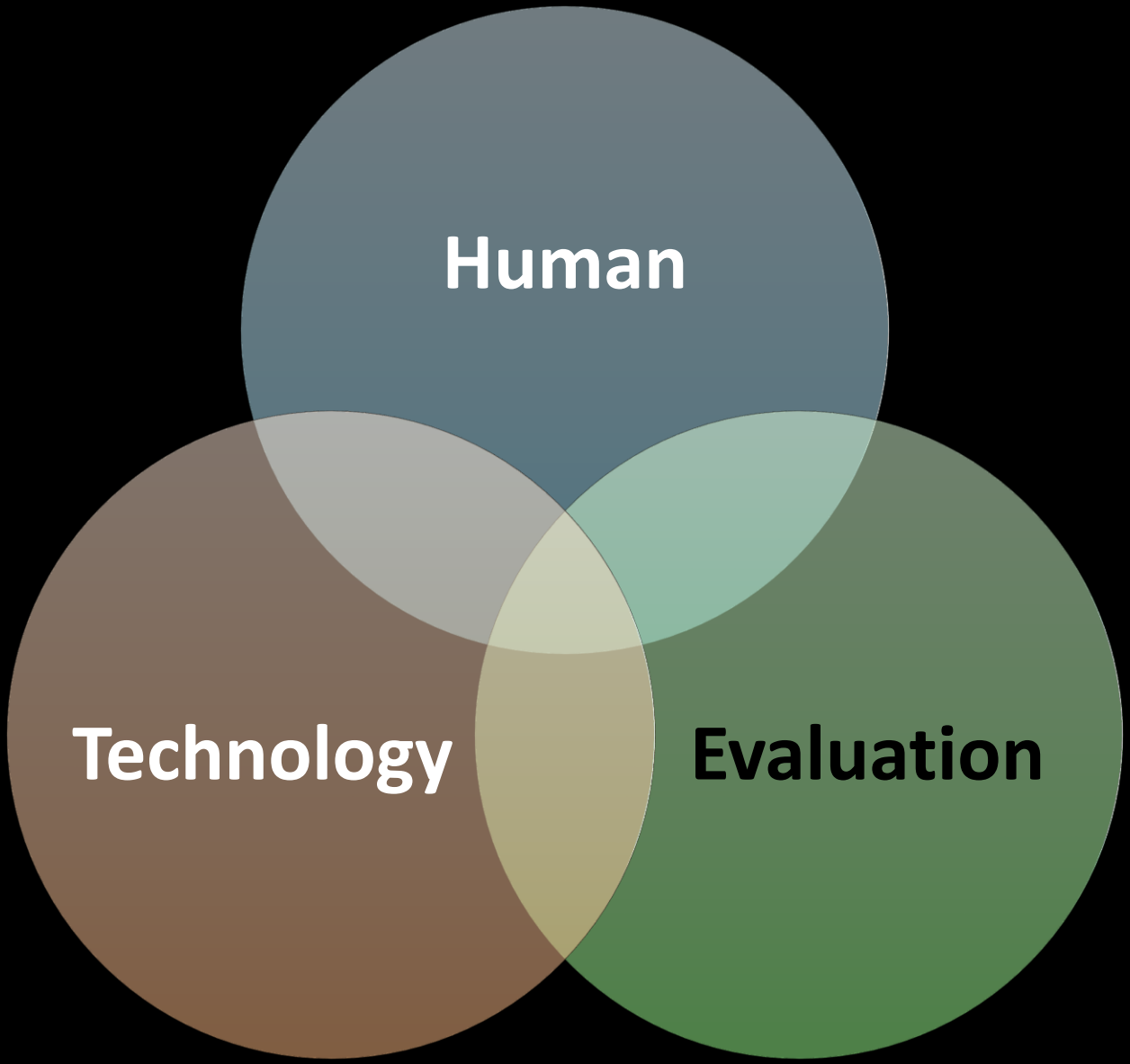
[O'Sullivan]

The Empirical Challenge

*"The results show that in today's applications, an average of **48% of the code** is devoted to the user interface portion.*

The average time spent on the user interface portion is 45% during the design phase, 50% during the implementation phase, and 37% during the maintenance phase."

– Myers & Rosson, CHI'92


Human
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Course Goals

Primary Source Material

Literacy Index

Research Methods

[Grossman, T. 2007]

[Ramachandran, D. 2010]


reading
doing

- Reading
- Writing
- Technical Presentation
- Critical Thinking

Syllabus

A Glance of The Course

- Seminal Ideas
- Human Performance Modeling
- Input and Interaction Techniques
- Affordance, Conceptual Model and Design Principles
- Mobile Interfaces
- Evaluation Techniques
- Statistical Decoding
- Integer programming
- Bayesian Optimization
- ...

Administrivia

Course Info

Tuesday, Thursday 2:30 pm-3:50 pm, Staller Center M0113

https://www3.cs.stonybrook.edu/~xiaojun/courses/CSE518.html

My Info

Office Hours: Tuesday, Thursday 1:00 pm-2:30 pm,

NCS 161

http://www.xiaojunbi.com

xiaojun@cs.stonybrook.edu

Textbook

- No official textbook.
- Cutting edge research published in top HCI conferences (*ACM CHI* and *UIST*)
- Seminal books

Seminal Books

- *The Design of Everyday Things* (2013) by Don Norman
- *The Psychology of Human-Computer Interaction* (1983) by Stuart K. Card, Thomas P. Moran, and Allen Newell
- *Doing Psychology Experiments* (7th Edition, 2008) by David W. Martin

Communication Policy

- Most of your questions (homework, deadlines, projects, etc.) should be publicly asked on Piazza, so that other students can benefit from the answers.

- Any personal email to the instructor or TA should include "[CSE518]" in the title.

Access Readings

- All readings are linked from the schedule on the course website

- Most readings are in the ACM digital library. On campus access is easy; from off-campus, you need to use a library proxy.

Grading

- 30% Midterm Exam. An In-class, closed-book exam.
- 30% 2 Homework Assignments (Group).
- 35% Final Exam or Individual Research Project

For research project:
Points breakdown: 35% = execution (15%) + final report (15%) + presentation (5%).

- 5% Participation. In class discussions

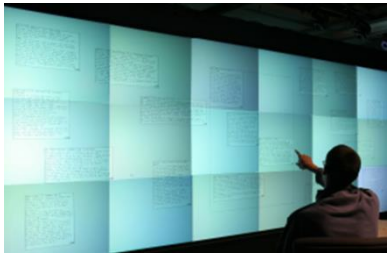
Projects

Research Projects

- The “doing” part of the course
- Working in groups (2-3 students) is strongly encouraged
- A project related to your research is great
- Let me know if you do this
- We are happy to offer project suggestions

My Research (1/2)

Post-PC Computing



Output

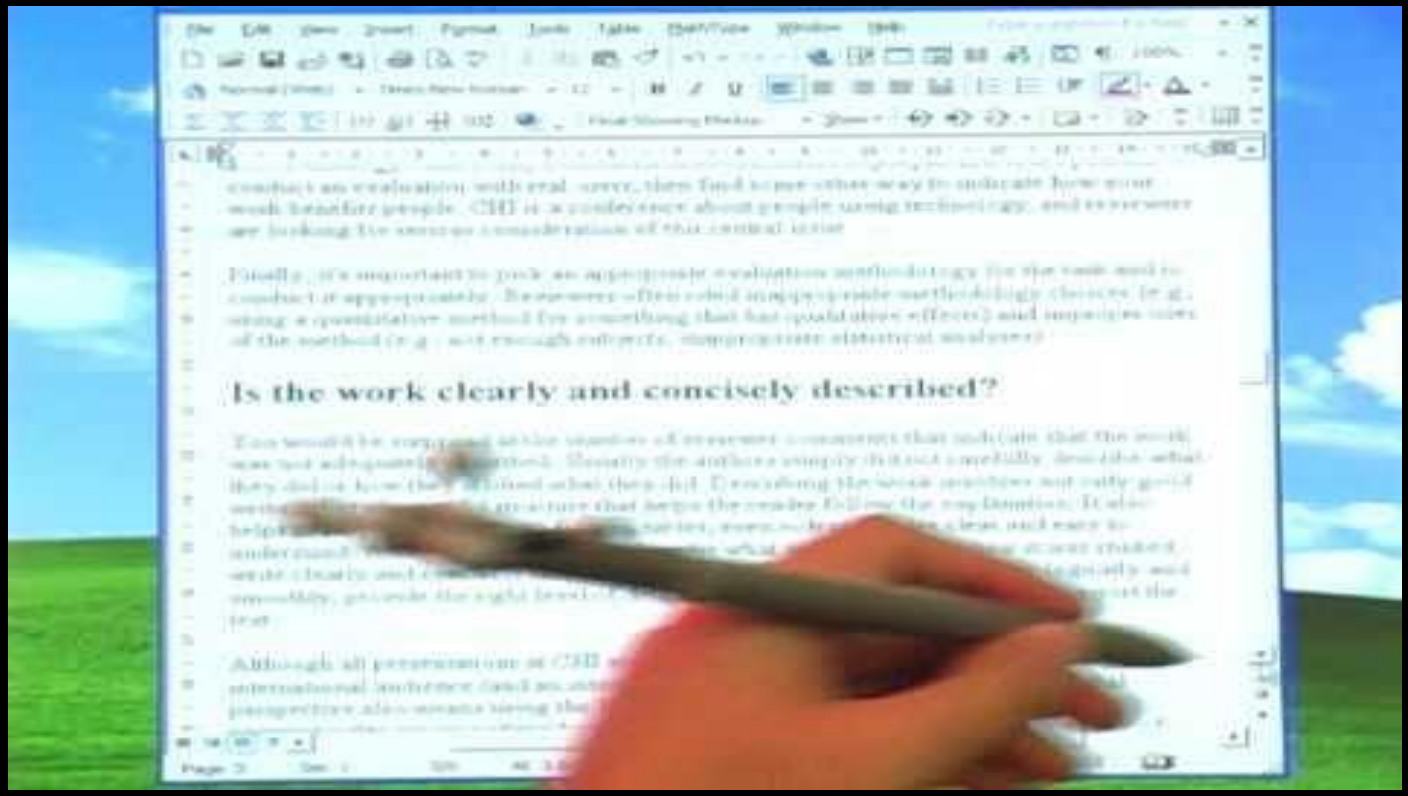
Computing Devices

Input

...

Magic Desk: Bringing Multi-Touch Surfaces into Desktop Work

Pen Rolling for Pen-based Interaction



WallTop: Manage Overflowing Windows on a Large Display

Bimanual Gesture Keyboard

CommandBoard: Creating a General-purpose Command Gesture Input Space for Soft Keyboards

COMPASS: Rotational Keyboard on Non-Touch Smartwatches

Typing on an Invisible Keyboard

CHI 2018

Engage with CHI

Typing on an Invisible Keyboard

Suwen Zhu[1] Tianyao Luo[1] Xiaojun Bi[1] Shumin Zhai[2]

[1] Stony Brook University

[2] Google

Questions?