The course is about
- The BIG questions of Cognitive Science
- How shall we explain or understand processes like thinking, reasoning, speaking, decision making, planning, and so on?
- How did cognitive science get where it is?
- Where can cognitive science go from here?

Cognitive science as a slice of scientific cake

What is mind?
- What is special about minds (even your cat’s mind) as opposed to inanimate objects?
- And what is special about human minds compared to other animal minds?
- Mindfulness is just matter… nicely orchestrated

Where is the mind?
- Many cognitive scientists say that the mind is in the brain. Or they say that the mind is what the brain does.
- Is this right?
- Is it the whole story?

The mind in the brain
Understanding cognition is largely understanding the dynamic flow of information through the system

From a talk by Jochen Triesch 2003
Disembodied Cognition?

Is the mind in the nervous system?
- A brain in a vat is a very poor model of the human cognitive system.
- The brain gets input from and sends output to the central nervous system.

Perhaps we need to add the body to explain the mind

Consider two example situations

Situation 1: driving your car while having a conversation
Situation 2: reading out aloud while tapping your feet to the rhythm of some music

Same input/output modules, yet different information flow!

From a WA talk by Jochen Triesch 2003

The mind in the interaction of the body with the world
- The body is in a physical world, and the structure of that world interacts with the body and the nervous system and the brain to shape what we think and how we think.

Photo: Ron Church, The Surfer's Journal Volume 9, No. 4

Mind in the interaction of the brain and body with a culturally constructed world
- Human life is lived in complex social environments that are filled with cultural artifacts.
- Our cognition and our mindfulness emerge from the interactions of our brains and bodies with this socio-cultural world.

Photo: Edwin Hutchins, 2003

The ingredients of scientific investigation
- Theory:
  - Distributed Cognition
- Method:
  - Cognitive Ethnography (COGS 102B)
- Domains of scrutiny:
  - Ship Navigation (CitW)
  - Science Laboratories
  - Commercial Aviation
**Distributed Cognition**

- Fundamental premise: Cognition, in all its forms, emerges from the interactions among the elements of complex systems.
- Specific hypothesis:
  - High-level human cognition depends on interactions with the material and social world.
  - Weak Dcog: Cognition is affected by or shaped by interactions with the material and social world.
  - Strong Dcog: Some forms of human cognition are constituted in interactions of brain and body with material and social world.

---

**Mindware**

Andy Clark
Philosopher of Cognitive Science

**The development of cognitive science**

- Andy Clark’s combination history and critical reflection.
- Mindfulness as (some sort of) computation.
- Recent wrinkles
  - Embodiment
  - Robotics
  - Dynamics
  - Interaction with the material world

---

**Cognition in the Wild**

**An extended case study of distributed cognition**

- Ship navigation
- How institutions think
- Where is the computation?
- Embodied cognition in cultural context
- Cognitive properties of groups
- Individual and institutional learning
- The costs of ignoring culture when studying cognition
How to Succeed in this Course

Basis of your Grade

<table>
<thead>
<tr>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm</td>
<td>8</td>
</tr>
<tr>
<td>Plagiarism Tutorial</td>
<td>5</td>
</tr>
<tr>
<td>4 Essays @18 ea.</td>
<td>72</td>
</tr>
<tr>
<td>Final Exam</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Do the Readings

- Keep up with the reading schedule
- Read carefully and critically
- Use the guidance provided on the class website
- THINK ABOUT WHAT YOU ARE READING!

Get a good Dictionary and use it

- Meanings
- Word choice
- Usage conventions
- Spelling
- Language is a social tool. Knowledge is power. Workout and get strong
Spend some Time on the Course

- The registrar expects you to work 12 hours per week for a 4 unit course!

Come to Lecture Sessions

- Clean, sober, and awake
- Do NOT sleep in class
- Cell phones OFF!
- Be here. No IM or web surfing in class
- If you don’t understand something, ASK for clarification.
- You may take notes if you like. Remember, the lectures will be podcast and the slides will be posted on the course web site.

Go to Section

- Discuss questions
- Clarify issues
- Get ideas for and help with your essays
- Prepare for the midterm and final exam

Do the Assigned Work

- Start ahead of time
- Be sure you understand each assignment
- Make your essays easy to read and understand (consult the Essay page of the course website).
- PROOFREAD! Check spelling and grammar
- Turn projects in ON TIME

Visit Office Hours

- We are here to help you
- You (or your parents) are paying for our time
- Explore ideas
- Clarify assignments
Do NOT attempt to CHEAT!
- Do your own work. You are encouraged to talk to other students about ideas, but do not “borrow” material from other students.
- Understand the concepts in the plagiarism tutorial.
- Do NOT look at your neighbor’s paper during the exams.

Be Creative
- Learning can be fun.
- This course is about ideas, not the memorization of facts.
- Ideas never stand alone. They are always related to other ideas. Explore the world of ideas.

Appreciate the Challenge of Cognitive Science
- Many of the central questions in this field are still unanswered.
- Most of them relate directly to your daily life in some way. Be alert for connections to your own experience.

For Tuesday
- Buy Cognition in the Wild and Mindware (Both available at the bookstore)
- Review the material on the course web site: http://hci.ucsd.edu/102a/
- In particular, consult reading guidance for Tuesday’s assignment on web site schedule page
- Read these two papers (available on the web site)
  - Mitch Resnick “Learning about life”
  - Edwin Hutchins, “Cognition, Distributed”

Cognitive Science 102A
Distributed Cognition
Professor Edwin Hutchins
http://hci.ucsd.edu/102a