What is COGNITIVE SCIENCE?
Cognitive science is: 
the INTERDISCIPLINARY scientific study 
of mind and its processes.
What is COGNITION?
Research on how information is processed.
How is the information transformed and represented in terms of behavior?
The Mind

Neuroscience

Philosophy

Computer science

Linguistics
Levels of analysis

high-level logic and planning

Low-level learning and decision mechanisms

Neuroscience

Philosophy

Computer science

Linguistics

The Mind
The Mind
Philosophy

Deduction

“"I am a thing that thinks.""

Thought experiment

Brain transfer

General theorizing

Materialism, dualism, functionalism
<table>
<thead>
<tr>
<th>Theory of mind</th>
<th>Plato</th>
<th>Descartes</th>
<th>Locke</th>
<th>Hume</th>
<th>Kant</th>
<th>Leibniz</th>
</tr>
</thead>
</table>
Computer science

- Analogy
- Methodological consequence
- Theoretical Analyses
- Computational complexity
- Computation and thinking
- Simulations = thinking?
Artificial Intelligence

Minsky
- Formal characterization of thought

Chomsky
- Generative Grammar

von Neumann
- Architecture

Turing
- Turing Test

McCulloch
- Models of computation

Pitts
- Artificial Neural Nets
Language

Acquisition

Abstraction

Pragmatics

Chomsky

Pinker

Elman

Innate or Learned?

Representation

Meaning from context

Formal grammar

It is all in the genes

Experience based learning
Neuroscience

- Biological Experiments
- Recording the brain
- Visualizing the brain
- Cell recording, PET, fMRI
- Computational
- Models of the mind
PERCEPTION * ACTION * THINKING
COGNITIVE SCIENCE IS EVERYWHERE
How do we select an appropriate action, given our goals?
Brain Computer Interface

Bionic hands? 2016
Robot with rat brain.

http://www.youtube.com/watch?v=1-0eZytv6Qk
# COURSE STRUCTURE

<table>
<thead>
<tr>
<th>Topics</th>
<th>Central to Cognitive Science</th>
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<tbody>
<tr>
<td></td>
<td>• Language, Mental Representation, Intentionality</td>
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<tr>
<td></td>
<td>• Development, Disorders, Computational Modeling</td>
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<table>
<thead>
<tr>
<th>Lectures</th>
<th>Cognitive Science Faculty</th>
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<tbody>
<tr>
<td></td>
<td>• Introduction to area of study</td>
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<tr>
<td></td>
<td>• Introduction to research in the department</td>
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<tr>
<th>Readings</th>
<th>Online</th>
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<td>• Each lecture will have assigned reading.</td>
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<tr>
<th>Sections</th>
<th>Weeks 2-10</th>
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<tr>
<td></td>
<td>• Quiz on previous week’s material – (lectures and readings.)</td>
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<tr>
<td></td>
<td>• Clarify and explain material presented.</td>
</tr>
<tr>
<td></td>
<td>• Required.</td>
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COURSE LINKS

Website  Click on “COGS1”

- http://www.cogsci.ucsd.edu/~mboyle

TritonED  Repository for all grades

- http://tritoned.ucsd.edu

Extra Credit  Experiment participation – sign-up

- SONA
Multiple choice and short answer Examinations

- Midterm1—scheduled for Tuesday week 5
- Midterm2—scheduled for Tuesday week 8
- Midterm3—scheduled for Thursday week 10

Administered in section Quizzes

- No make-up quizzes
- Drop lowest quiz grade
- If needed, attend a different section (advise your TA/IA)

Use SONA to sign-up Extra Credit

- Experiment participation 4 hours maximum

COURSE GRADING SCHEME