Brain and Cognitive Sciences

- Josh Tenenbaum (lead)
- Nancy Kanwisher
- Rebecca Saxe
- Sam Gershman

Areas of interest

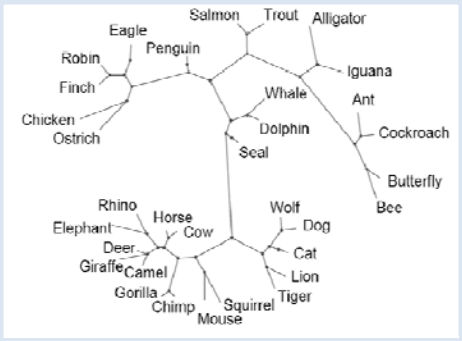
- Modeling human knowledge with probabilistic models defined over structured representations.
  - Statistics meets hierarchy, recursion, compositionality.
- High-level scene and event understanding.
  - Perceiving physical properties and dynamics
  - Nonverbal social perception and theory of mind.
  - Integrating natural language semantics with perception.
- Neural basis of scene understanding, language and theory of mind.
  - fMRI, TMS, ECoG; MVPA and Bayesian modeling of fMRI.
- Representing abstract (hierarchical, recursive, compositional) knowledge in neural systems.

Capabilities

Abstract principles

tree: 

Model



Data

features

animals

```
(define drawclass (DPmem 1.0 gensym))
(define class (mem (lambda (obj) (drawclass))))

(define irm-mean
  (mem (lambda (obj-class1 obj-class2)
```

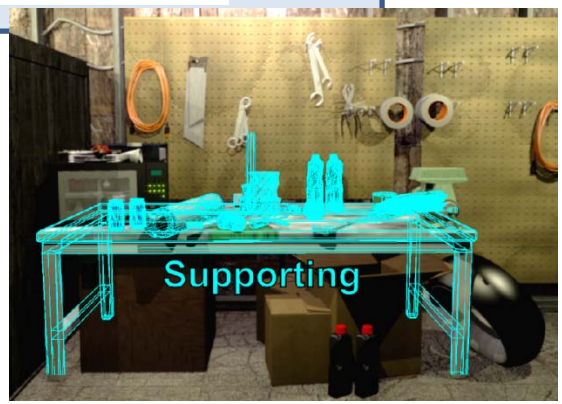
```
(define objects (repeat (poisson 1.0) gensym))
(define depth (mem (lambda (object time) (depth
(define location (mem (lambda (object time)
```

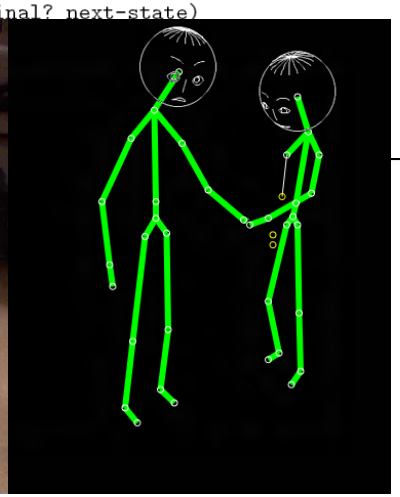
```
(define (choose-action state)
  (lex-query
   '((action (action-prior)))
   'action
   '(flip (normalize-reward
           (sample-reward action state)))))

(define (sample-reward action state)
  (let ((next-state (state-transition state action)))
    (+ (reward next-state)
       (if (terminal? next-state)
```

Categories and relations

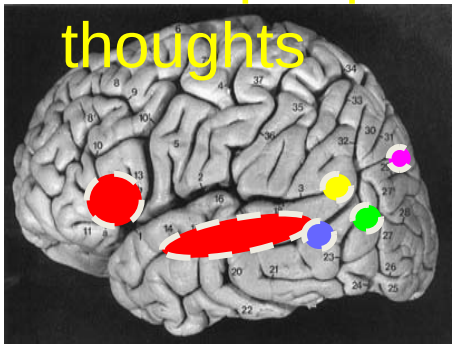
Physical objects

Rational agents

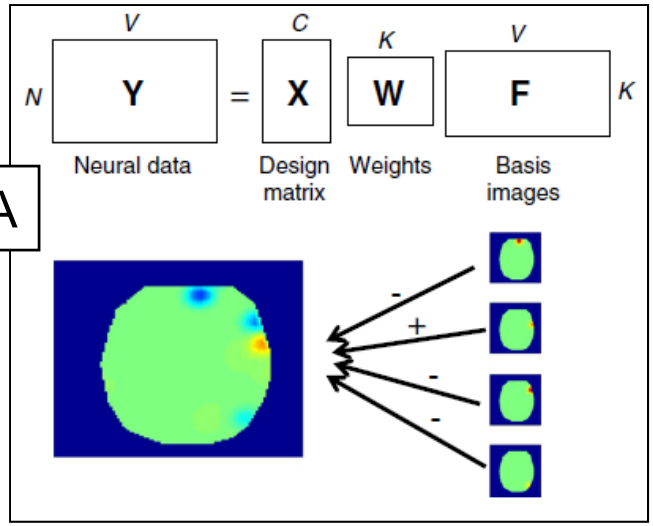


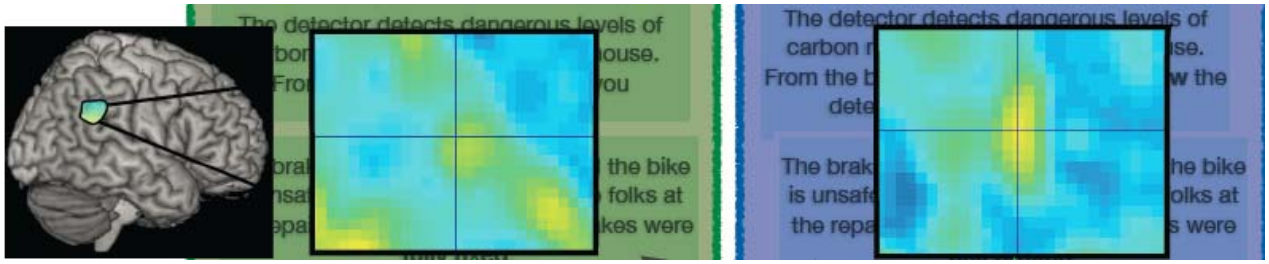


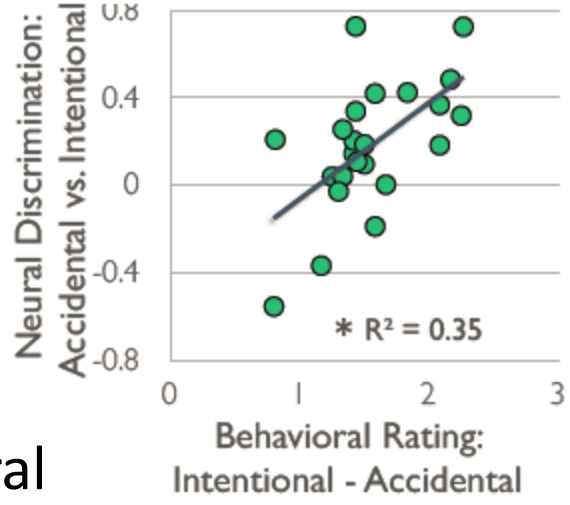
Teaming



TLSA







- Partners: computational neural decoding, neural representation of semantic knowledge, project management

Contact Information

- Josh Tenenbaum
- Professor
- MIT
- jbt@mit.edu
- 617-452-2010
- http://web.mit.edu/cocosci/josh.html