My Interests:
What is the architecture of the human mind (fundamental components?)
How does this structure arise over development and over evolution?
What are the computations and representations in each region?
How do these parts work together to make us smart?
What is “special” about the human brain that enables uniquely human cognition?
Thrust 4: Social Intelligence

Goal: To understand the cognitive, computational, and neural basis of social perception.

PIs: Kanwisher, Nakayama, Tenenbaum, Saxe, Spelke

Why social intelligence?

Grad Students & Postdocs:
Why Social Intelligence?

• Social cognition is the crux of human intelligence
  – The source of much of human intelligence
  – A major driver of evolution of the brain
  – A large percent of human cognition (in minutes & cortical area)
  -- Greatest feats of the human intellect are products of groups of people working together

Thrust four: social perception. What is that?
Turing++ Questions for Social Perception

-- Who is this?

– What are they attending to?

– What are they doing?

– What will happen next?

– What are they feeling?

– What is their character?

– Are they interacting with someone else?

– What is the nature of the interaction?


Brain Specializations for Social Perception
Infants
Adults


Thrust 4 Approach

Study these abilities in the system that does them best: the human mind and brain.

Roadmap:
1. Psychophysics
   Characterize and quantify each ability:
   how good are we?
   what cues?
   characterize the input
2. Computational modeling
3. Discover brain basis with fMRI
   ECOG
   NIRs

some specific projects.....
Turing++ Questions for Social Perception

-- Who is there?

   Peterson: Face Recognition in Real-World Viewing

– What are they attending to?

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Brain Specializations of Social Perception

   Infants    Lindsey Powell (+T1, Saxe)

   Adults
Turing++ Questions for Social Perception

-- Who is there?
   Peterson: Face Recognition in Real-World

– What are they attending to?
   Daniel Harari, Tao Gao (+T1, Tenenbaum)

– What are they doing?
   Tao Gao, Harari (+T1, Tenenbaum)

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Brain Specializations for Social Perception
   Infants
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Gaze perception and the acuity of joint attention

Psychophysics and Modeling of reach target discrimination.

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-- Who is there?
    Peterson: Face Recognition in Real-World Viewing
– What are they attending to?
    Daniel Harari, Tao Gao (+T1, Tenenbaum)
– What are they doing?
    Tao Gao, Harari (+T1, Tenenbaum)
– What will happen next?
    Maryam Vaziri-Pashkam & Nakayama
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Brain Specializations of Social Perception

Infants
Adults

Ultrafast Blocking movements
(150ms, faster than choice RT)
Predictive information exists prior to finger movement
Information distributed over body
Humans can extract this information without learning probably implicitly
Shows stunning action prediction
Next: machine learning on stimuli to discover cues
Brain Specializations of Social Perception

Infants

Adults

Brain Specializations of Social Perception

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Turing++ Questions for Social Perception

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  Maryam Vaziri-Pashkam & Nakayama

– What are they feeling?
  McKone & Dawel

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– What is the nature of the interaction?

Elinor McKone:
  Virtually entire literature on perc of facial emotion uses posed expressions!

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Psychophysics
  fMRI (&MEG?) decoding of:
  real versus posed
  real E1 vs real E2
  static vs dynamic
Turing++ Questions for Social Perception

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– What is their character?
  Isik, Kreiman, Kanwisher neural decoding

– Are they interacting with someone else?
  Isik, Kreiman, Kanwisher neural decoding

– What is the nature of the interaction?
  Isik, Kreiman, Kanwisher neural decoding

Brain Specializations of Social Perception
  Infants
  Adults

Decoding neural data (ECOG, fMRI, and MEG) of people watching movies: identity (face/voice/body) actions good guy/bad guy interactions (pos/neg) etc.

Leyla Isik
Turing++ Questions for Social Perception

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Brain Specializations of Social Perception
    Infants  Lindsey Powell (Saxe)
    Adults
Brain Specializations of Social Perception

**Infants**  Lindsey Powell (Saxe)

**Adults**  Ben Deen, Rebecca Saxe

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**Who is there?**
Peterson, Ullman (+T3): Face Recognition in Real-World Viewing

**What are they attending to?**
Daniel Harari, Tao Gao (+T1, Tenenbaum)

**What are they doing?**
Tao Gao, Harari (+T1, Tenenbaum)

**What will happen next?**
Maryam Vaziri-Pashkam & Nakayama

**What are they feeling?**
McKone & Dawel

**What is their character?**
Isik, Kanwisher, Kreiman neural decoding

**Are they interacting with someone else?**
Isik, Kanwisher, Kreiman neural decoding

**What is the nature of the interaction?**
Isik, Kanwisher, Kreiman neural decoding

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The human STS comprises multiple functionally specific subregions for different aspects of social cognition.
Resource: Brains, Minds and Machines Summer Course
Tomaso Poggio and Gabriel Kreiman

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