

# MAPPING HUMAN CORTEX

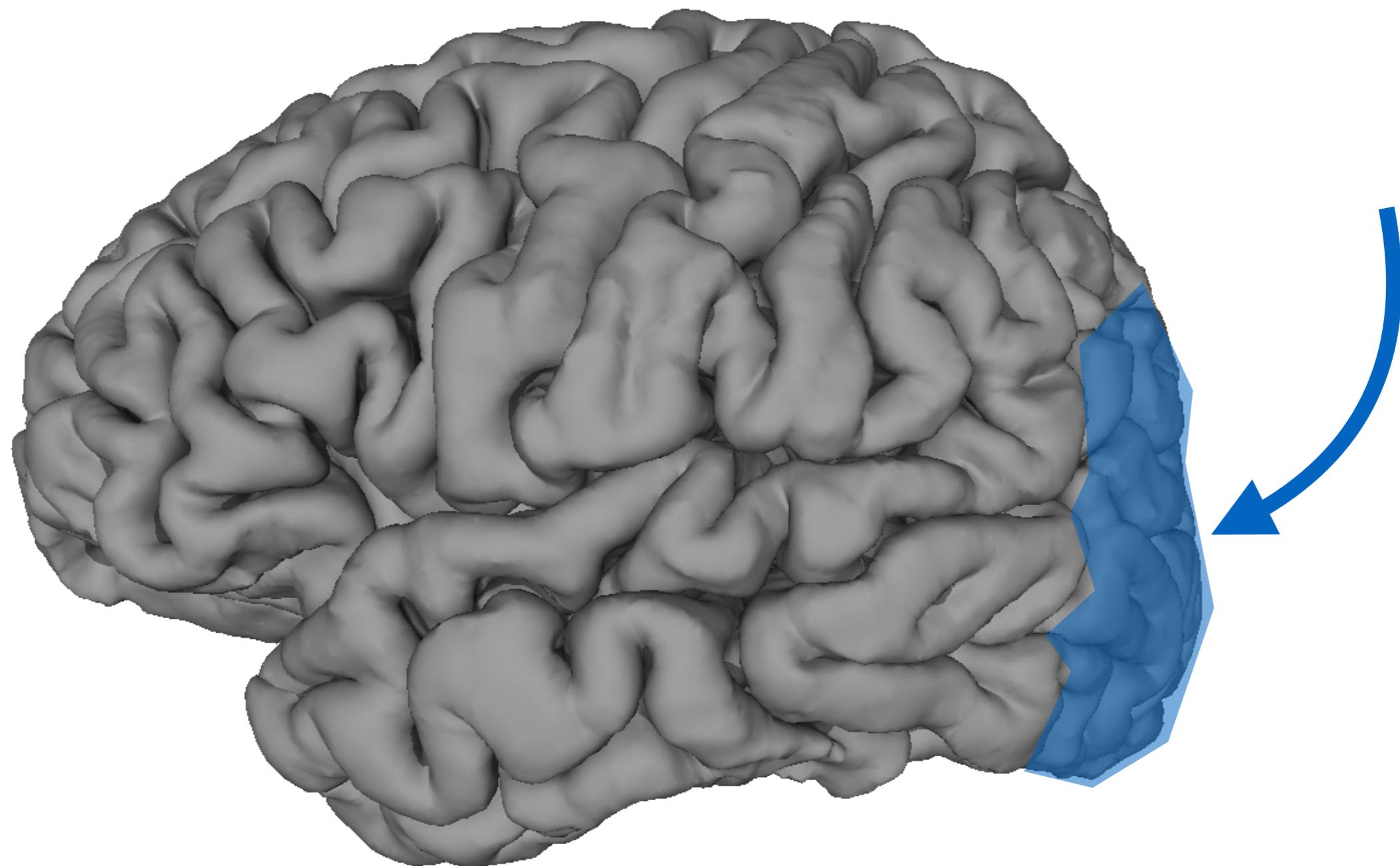
Prof. Alexander Huth

9.17.2020

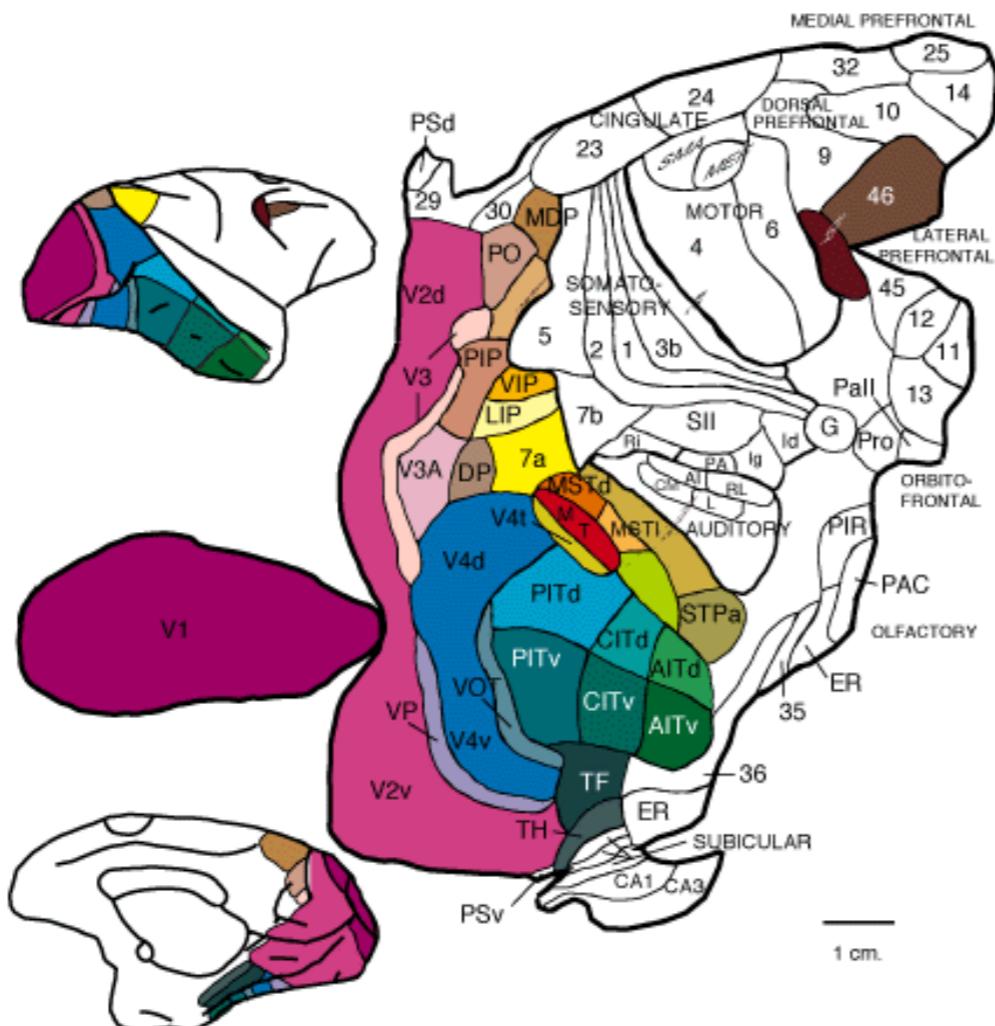
# INFOGRAPHIC

- \* Your first **infographic** homework is due in **1 week** (9/24)
- \* I posted a video demo for how to do this!
- \* You can find all the info you need here:  
<https://github.com/alexhuth/cortex-fa2020/tree/master/infographic>

# VISUAL CORTEX

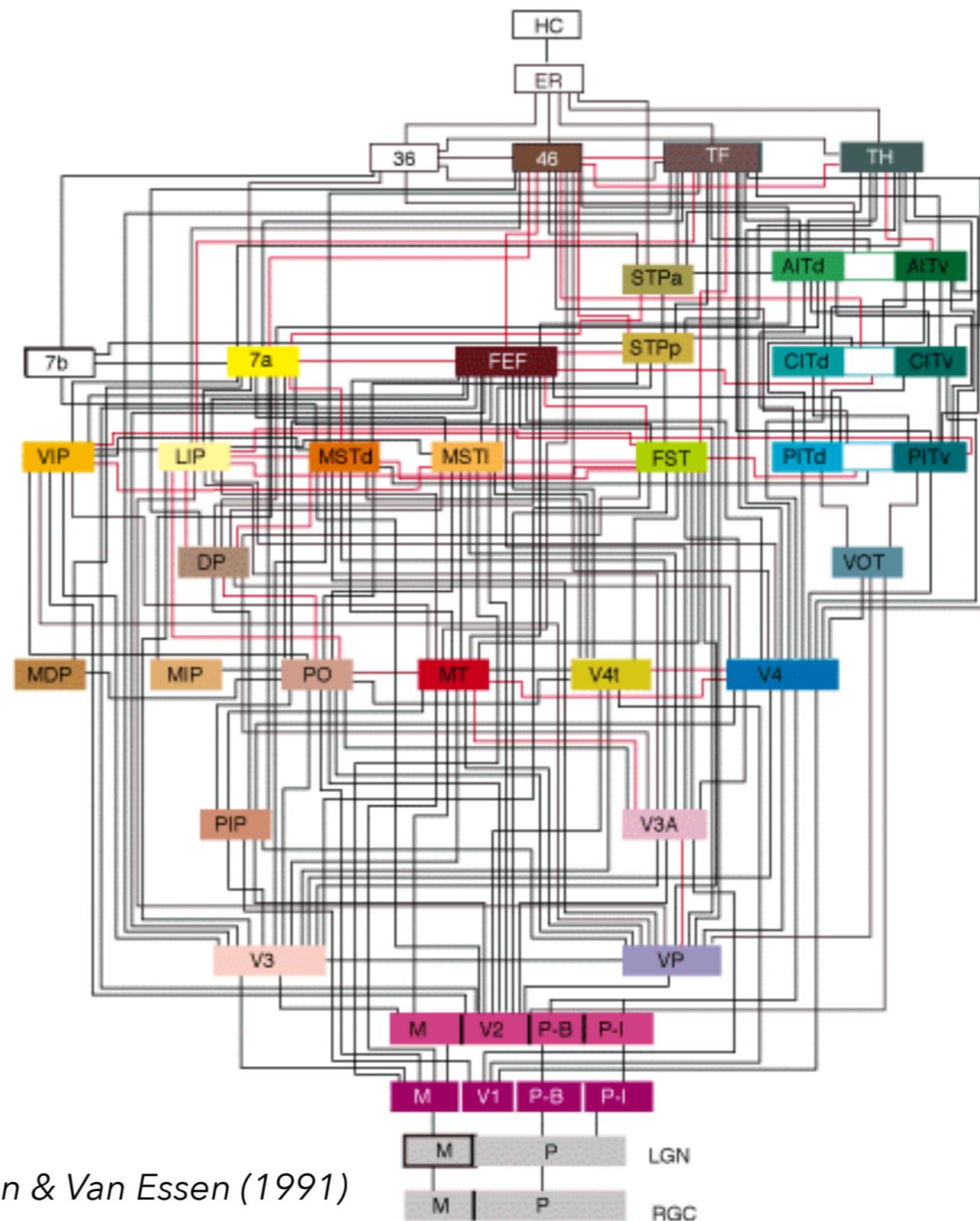


# VISUAL CORTEX AREAS



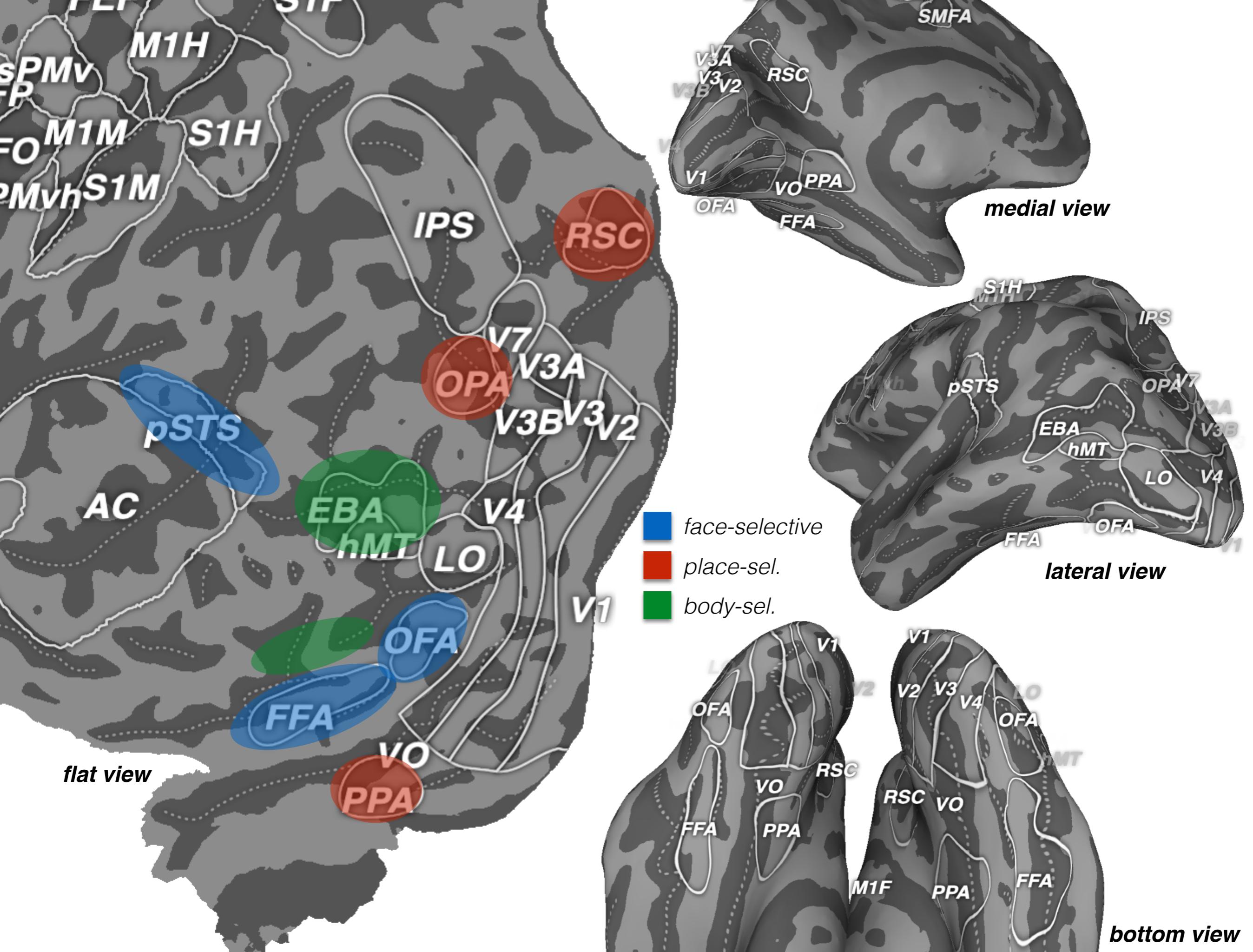
David Van  
Essen

Felleman & Van Essen (1991)



# CATEGORY SELECTIVITY

- \* Many parts of anterior ("higher-level") visual cortex are **category-selective**
  - \* We call these areas **semantic** because they care about *meaning* more than *form*
- \* e.g. the **face areas** (FFA, OFA, etc.) and the **place areas** (PPA, OPA, RSC)



# FACE AREAS

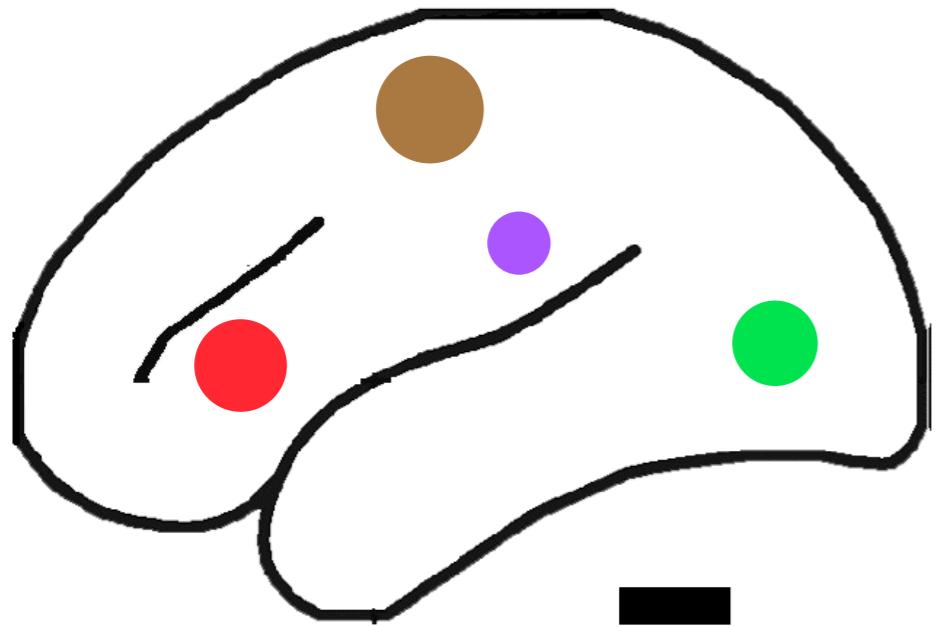
- \* The first identified “semantic” areas in visual cortex are the **face-selective** areas
  - \* FFA, OFA, etc.



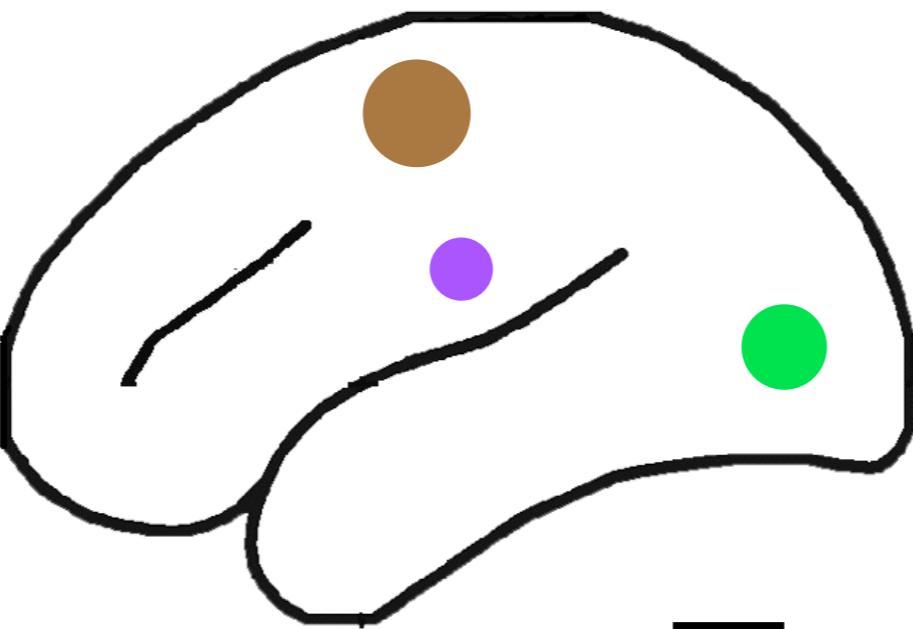
*Nancy  
Kanwisher*

# DEDUCTIVE APPROACH

- \* the “**contrast method**”  
aka “**localizer method**”  
aka “**subtraction method**”
- \* Subtract response in **control condition** from response in **experimental condition**
- \* Use some **statistical method** to determine whether difference in response is **significant**

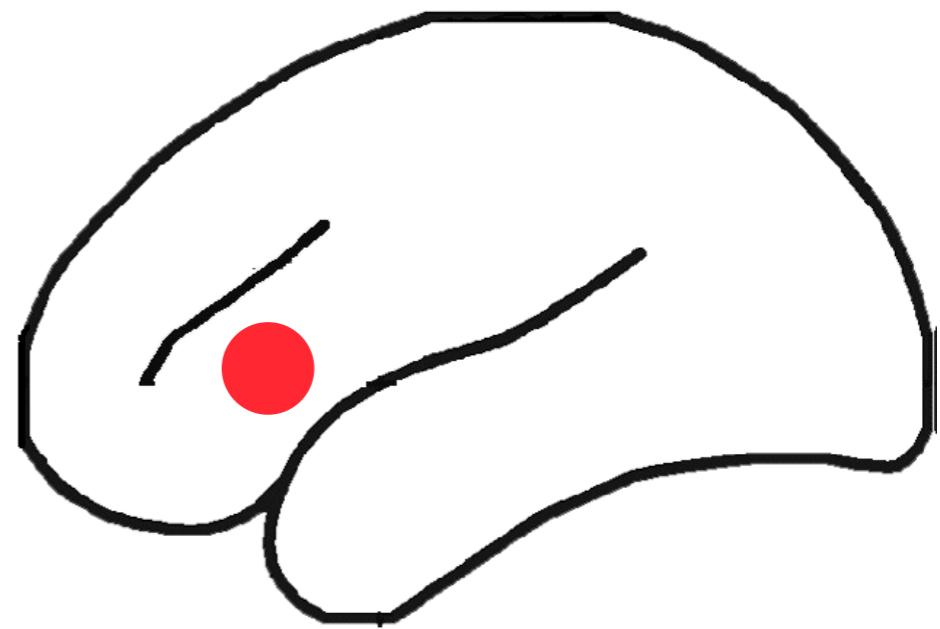


Task



Control

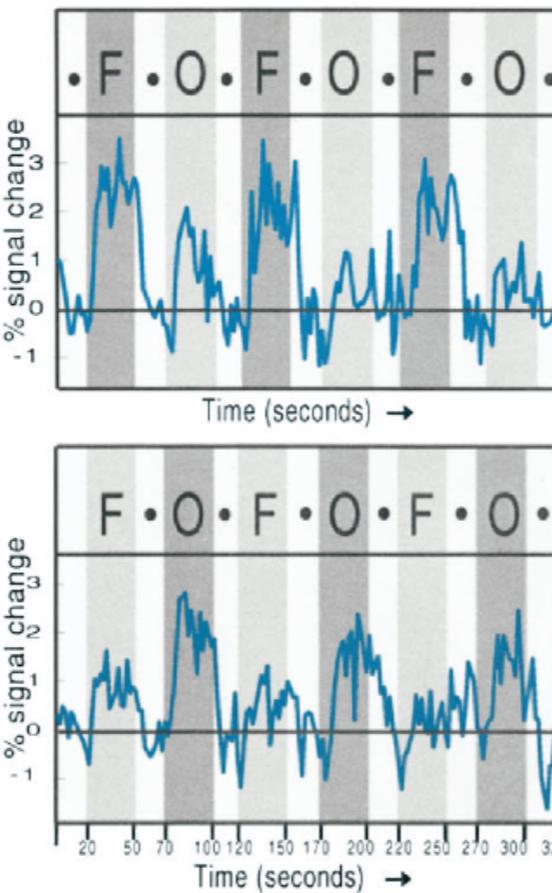
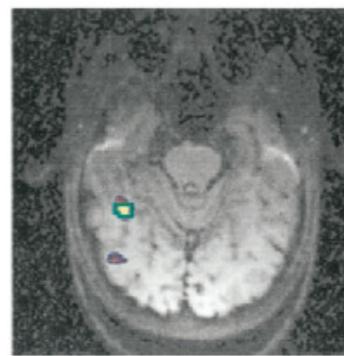
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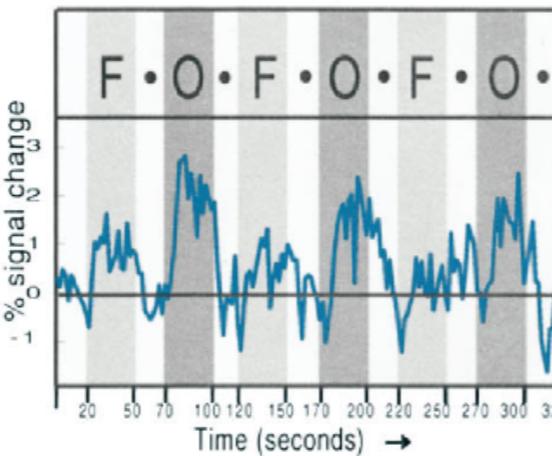
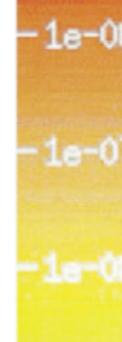
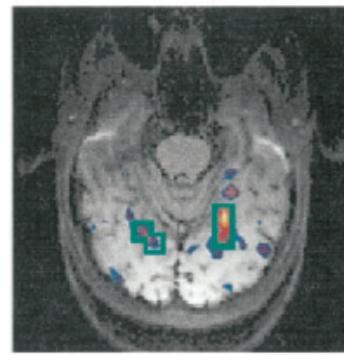
Difference

# Functional localizer for the fusiform face area

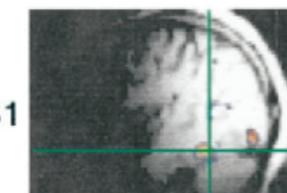
1a. Faces > Objects



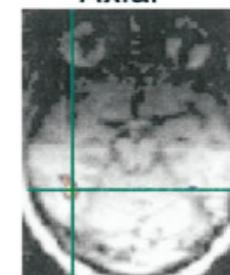
1b. Objects > Faces



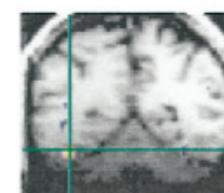
Sagittal



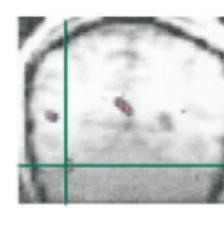
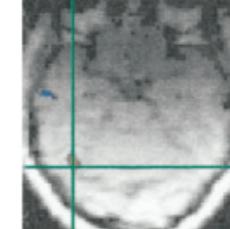
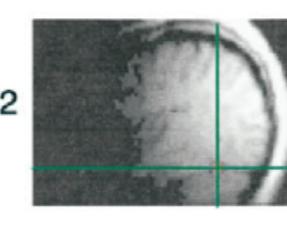
Axial



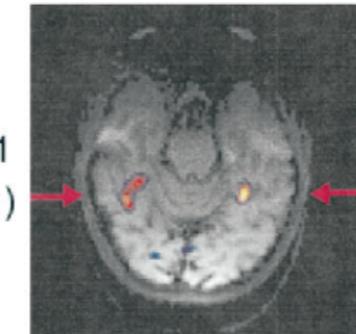
Coronal



S2



S11  
(Lh)



S12  
(Lh)

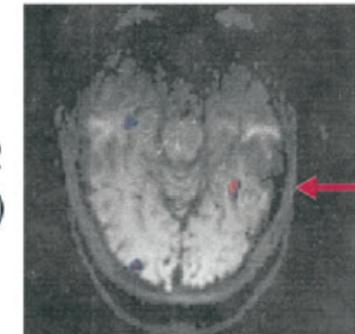
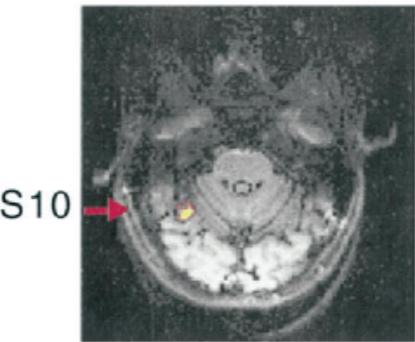
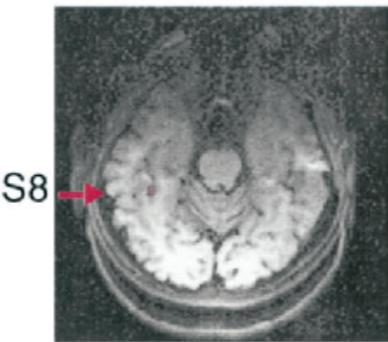
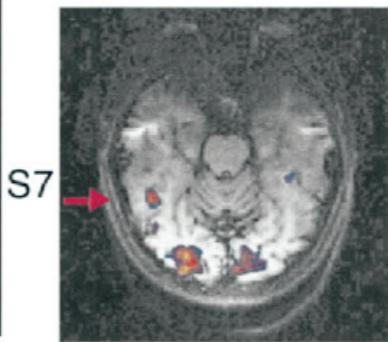
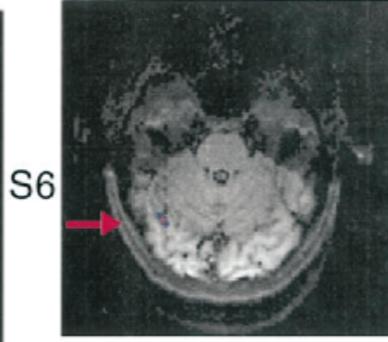
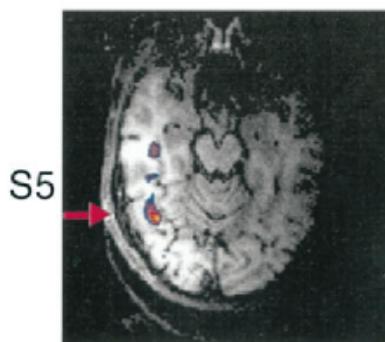
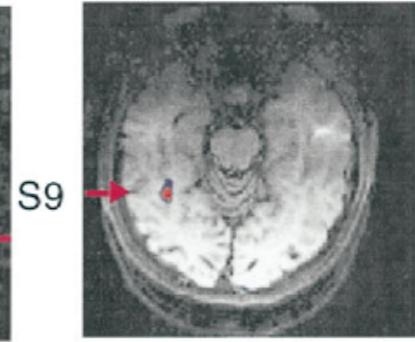
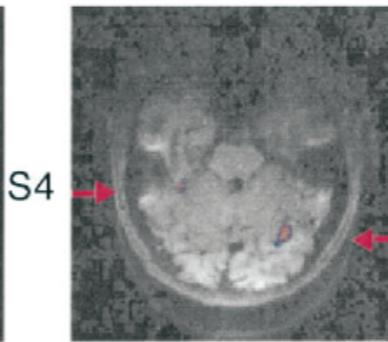
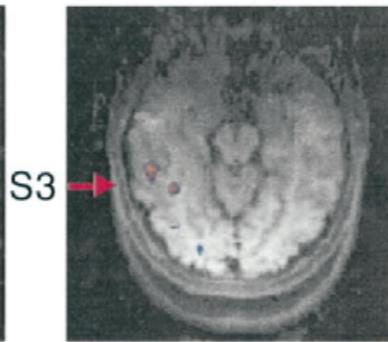
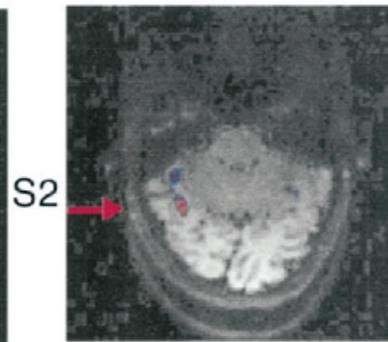
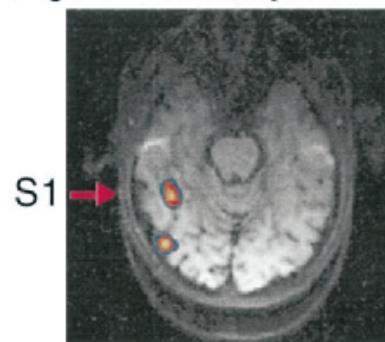
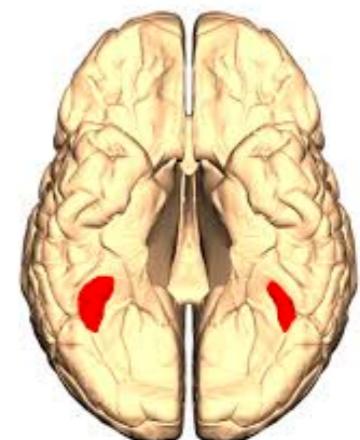


Fig 2. 12 Subjects



# LOCALIZATION

- \* What have we learned from finding the fusiform face area (FFA)?
- \* What more do we want to know?



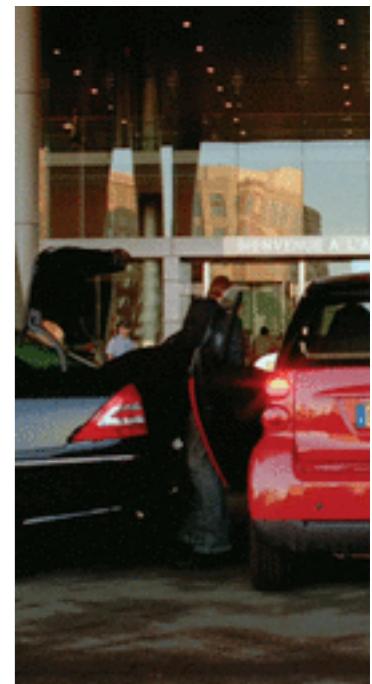
# LIMITS OF DEDUCTION

- \* Each experiment is designed to a small number of **hypotheses**
- \* What if truth doesn't clean map onto these hypotheses?
- \* What if the result doesn't generalize?

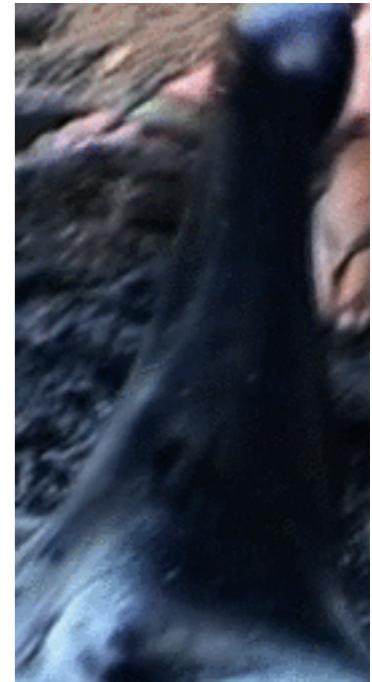
# INDUCTIVE APPROACH

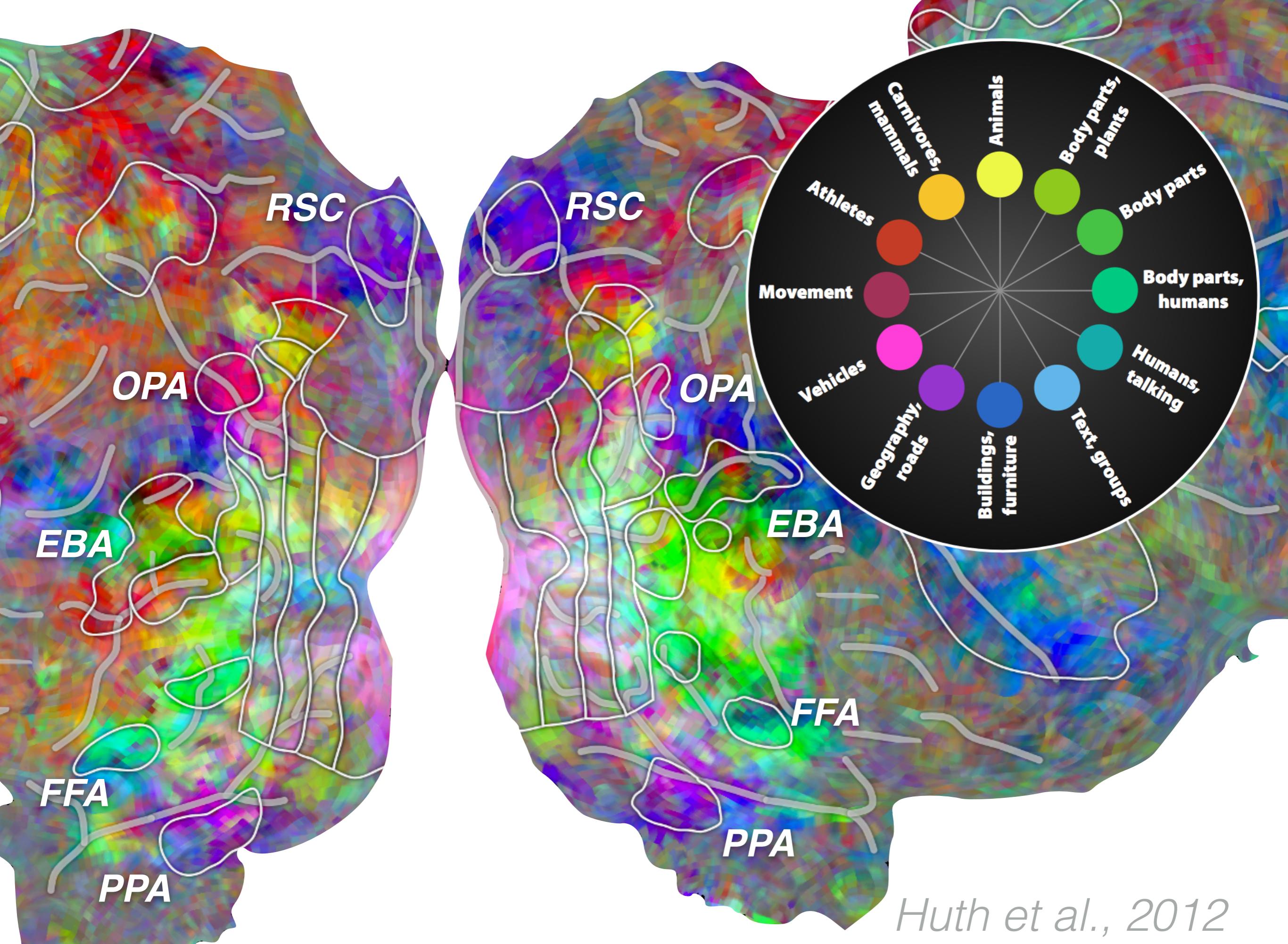
- \* **Measure** brain responses to a wide variety of stimuli
- \* **Build** model to predict responses based on stimuli
- \* **Test** whether model generalizes to different stimuli
- \* **Use** model to answer questions about brain

# NATURAL STIMULI



horseman  
horse  
walk  
road  
spectator  
mountain





**UNTIL**

**NEXT**

**TIME**