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Using an MRI to Learn About the Brains of Dogs

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"A rollicking yet scientifically serious study of the mental life of dogs."

—PATRICIA CHURCHLAND, author of *Touching a Nerve*

How Dogs Love Us

*A Neuroscientist and His Adopted
Dog Decode the Canine Brain*

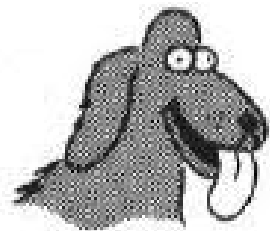


GREGORY BERNIS

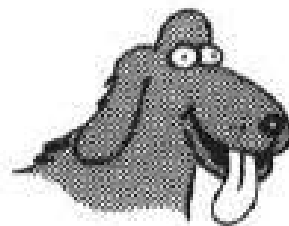
Dogs belong to that select group of con artists at the very top of the profession, the ones who pick our pockets clean and leave us smiling about it.

Biologists, if they weren't victims of the same blindness that afflicts us all, wouldn't hesitate to classify dogs as social parasites.

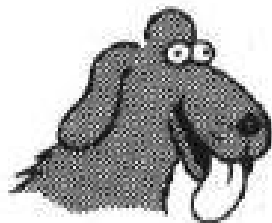
-- Stephen Budiansky, *The Truth About Dogs*, 2000



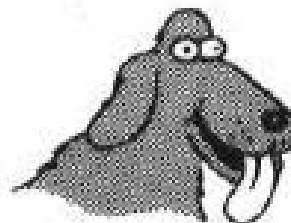
happy



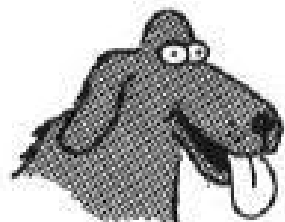
depressed



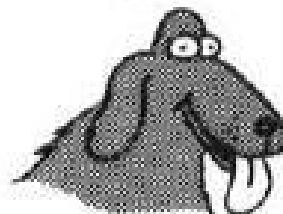
angry



pensive



excited



suicidal

How to recognize the moods of an Irish setter





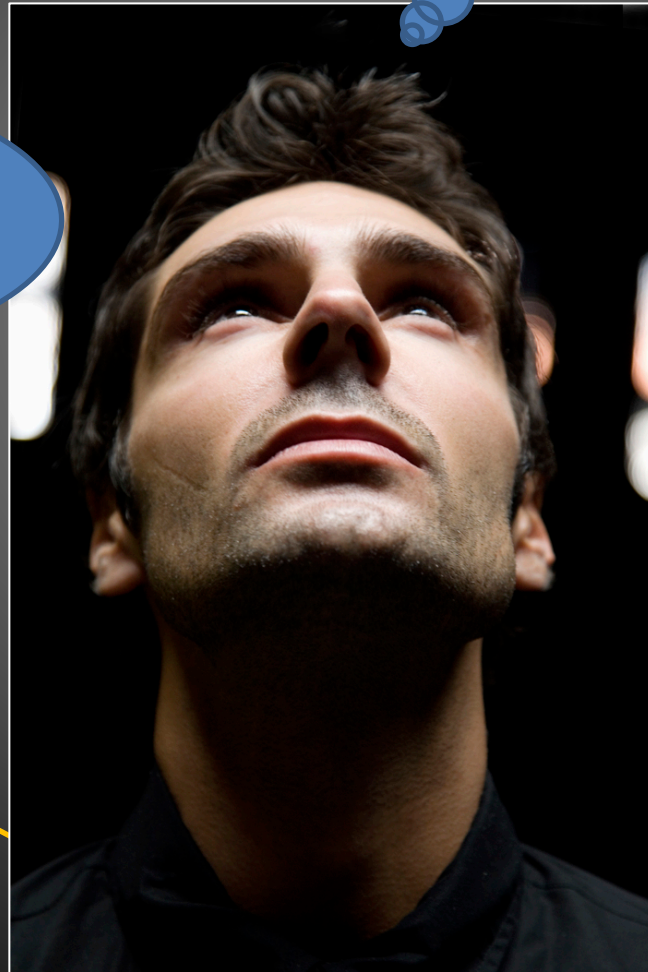




IS IT ALL A SCAM?

THOUGHTS

WHAT YOU
SAY



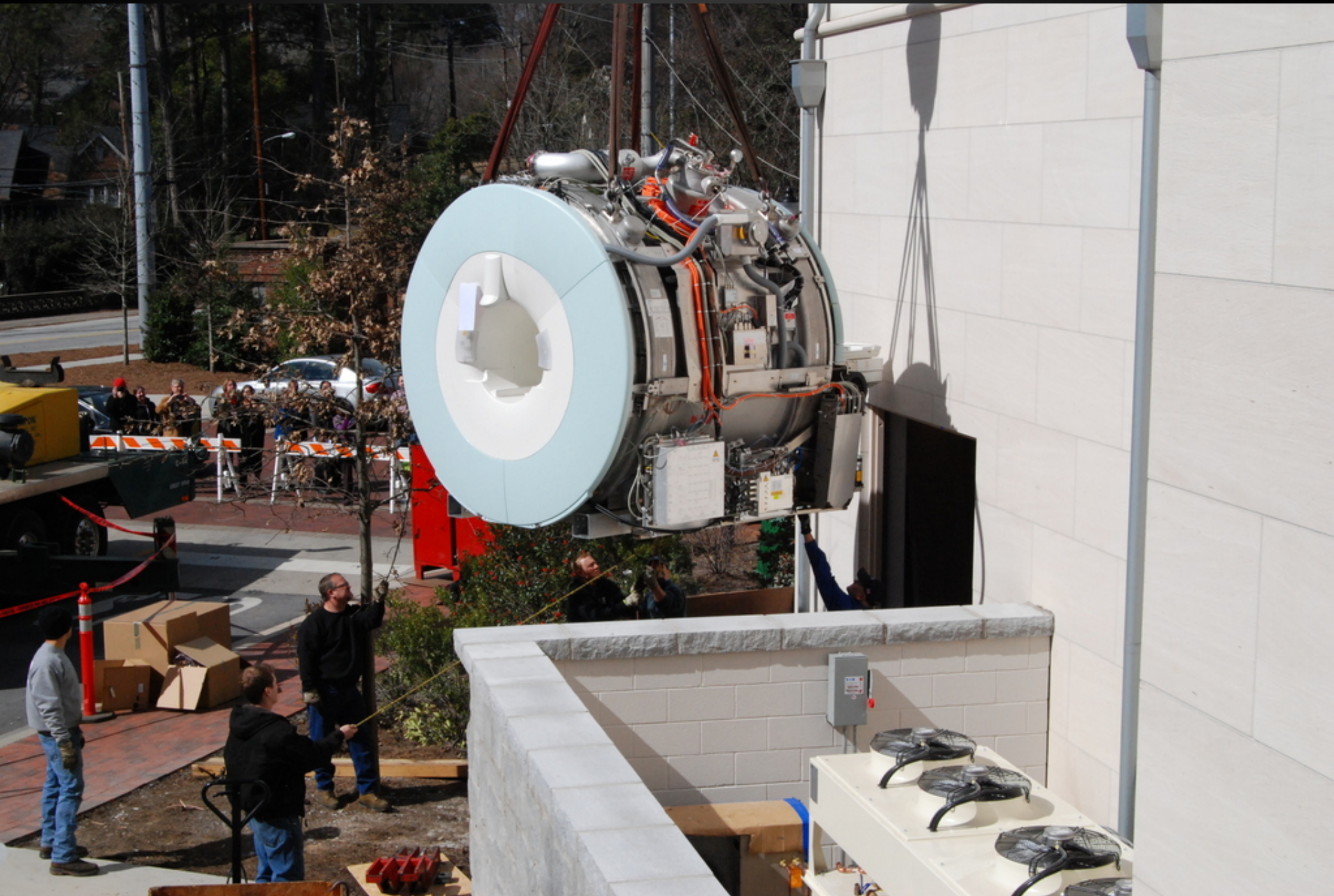
WHAT YOU
DO

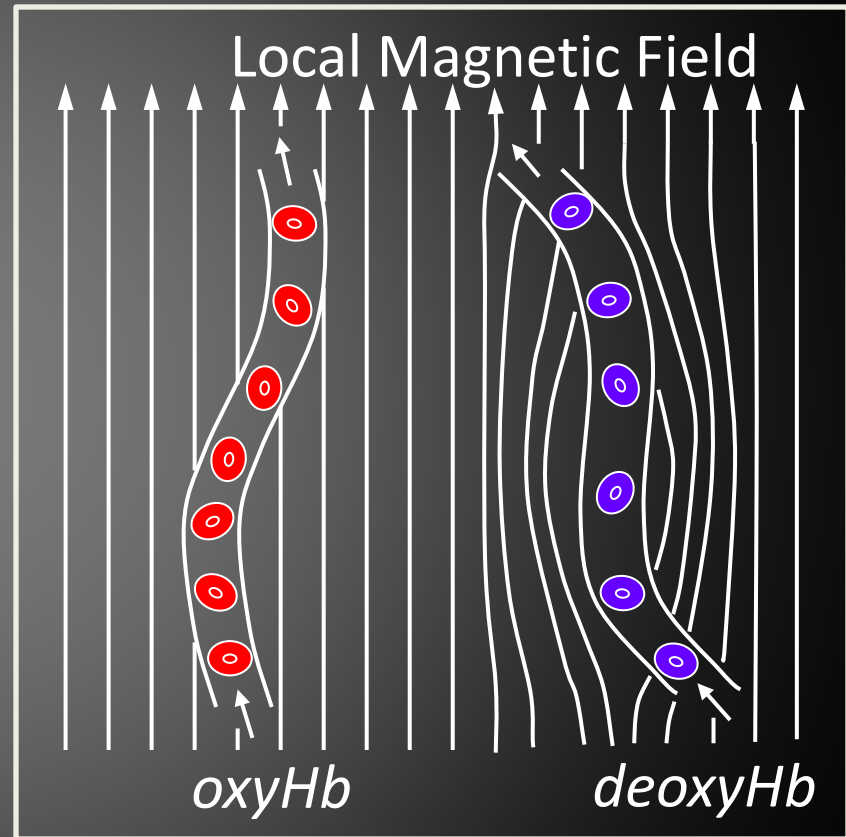
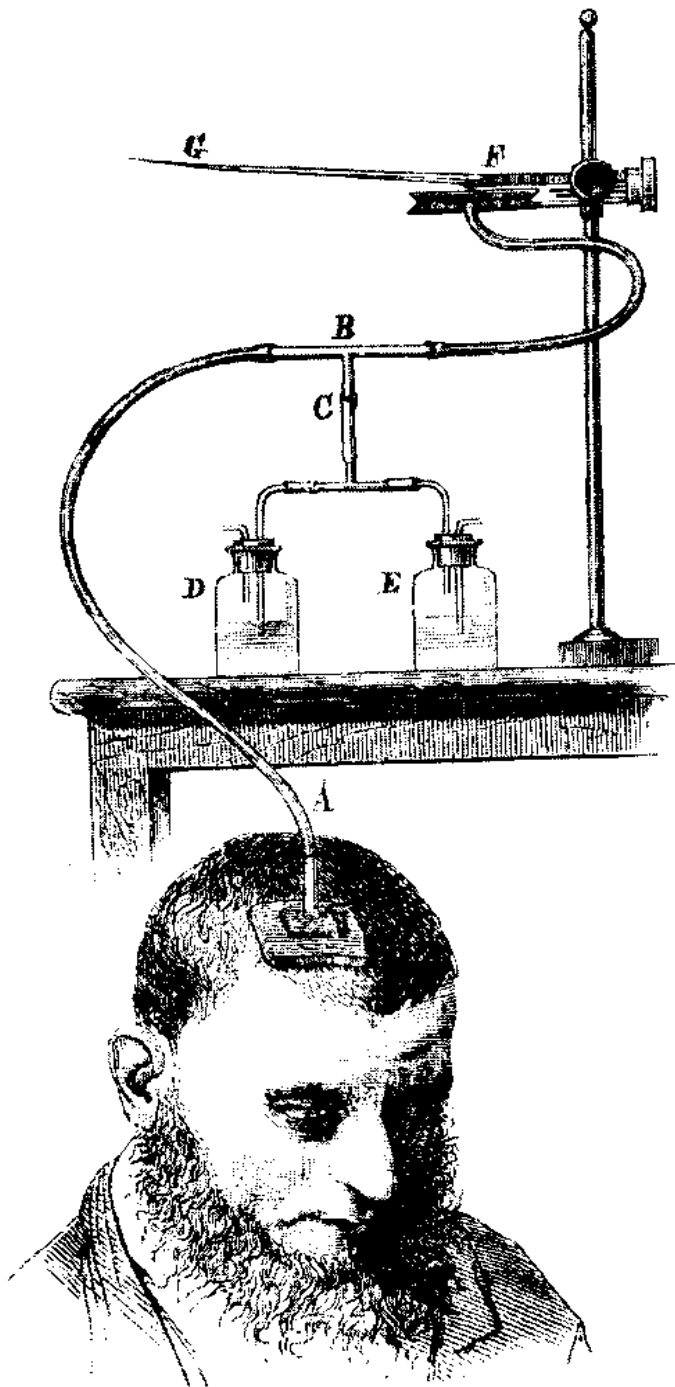
THOUGHTS

~~WHAT YOU
SAY~~



WHAT YOU
DO





Use fMRI to:

- Proof of concept
 - Can we obtain usable data from an awake dog?
 - Does reward system activity reflect salience of stimuli?
- Harder questions
 - How does olfactory system encode identity?
 - How does visual system encode identity?
 - Are there differences between dogs?

Challenges

- No movement!
- Novel environment
- Enclosed space
- Elevated
- Loud

Ethical Principles

- No harm
- No restraints (physical or chemical)
- Positive reinforcement

BUILDING THE SIMULATOR





TRAINING









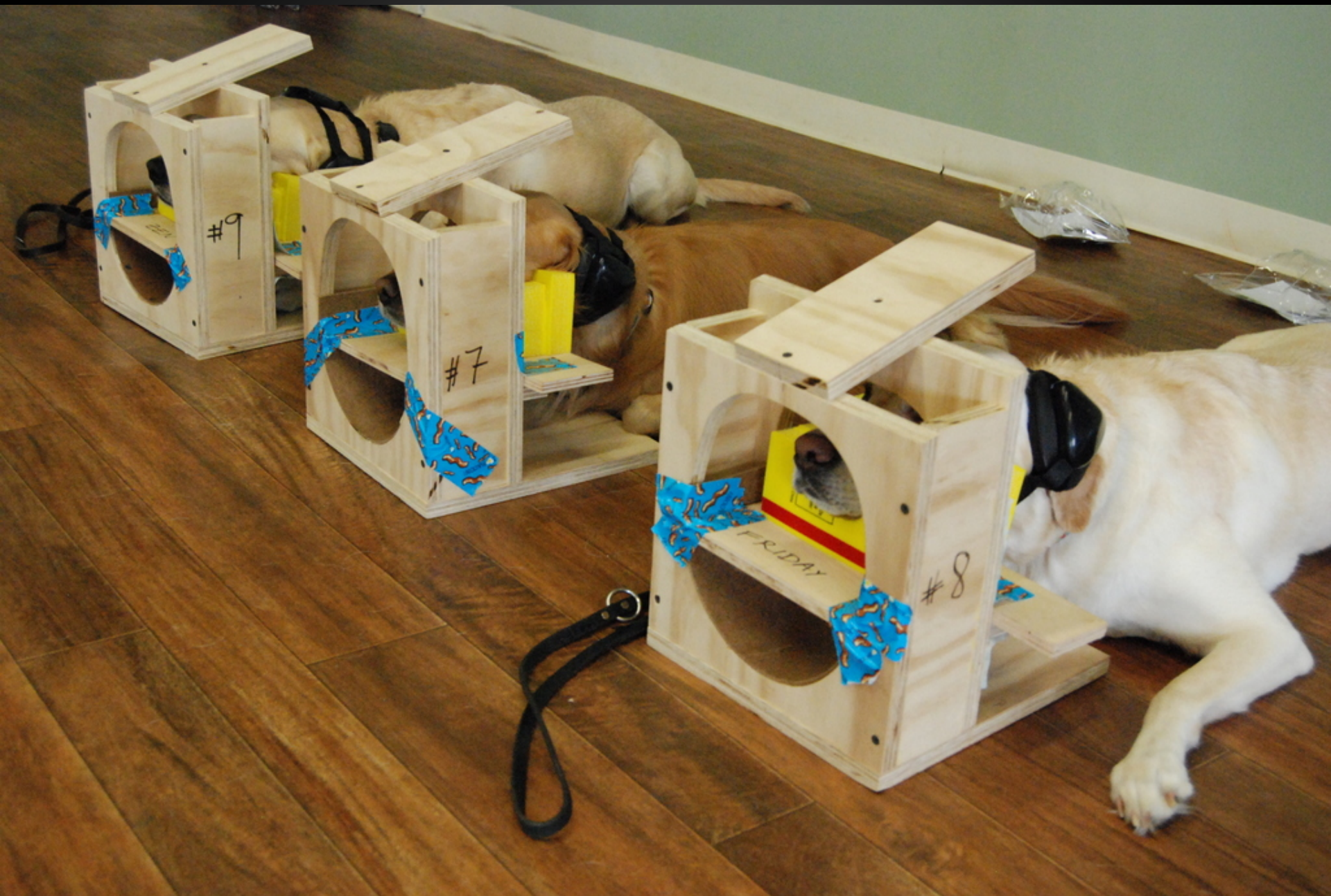


2011
Fun Fun Fun

CANINE
ASSISTANTS

SCHEFFELING





#9

#7

#8

FRIDAY





SCANNING







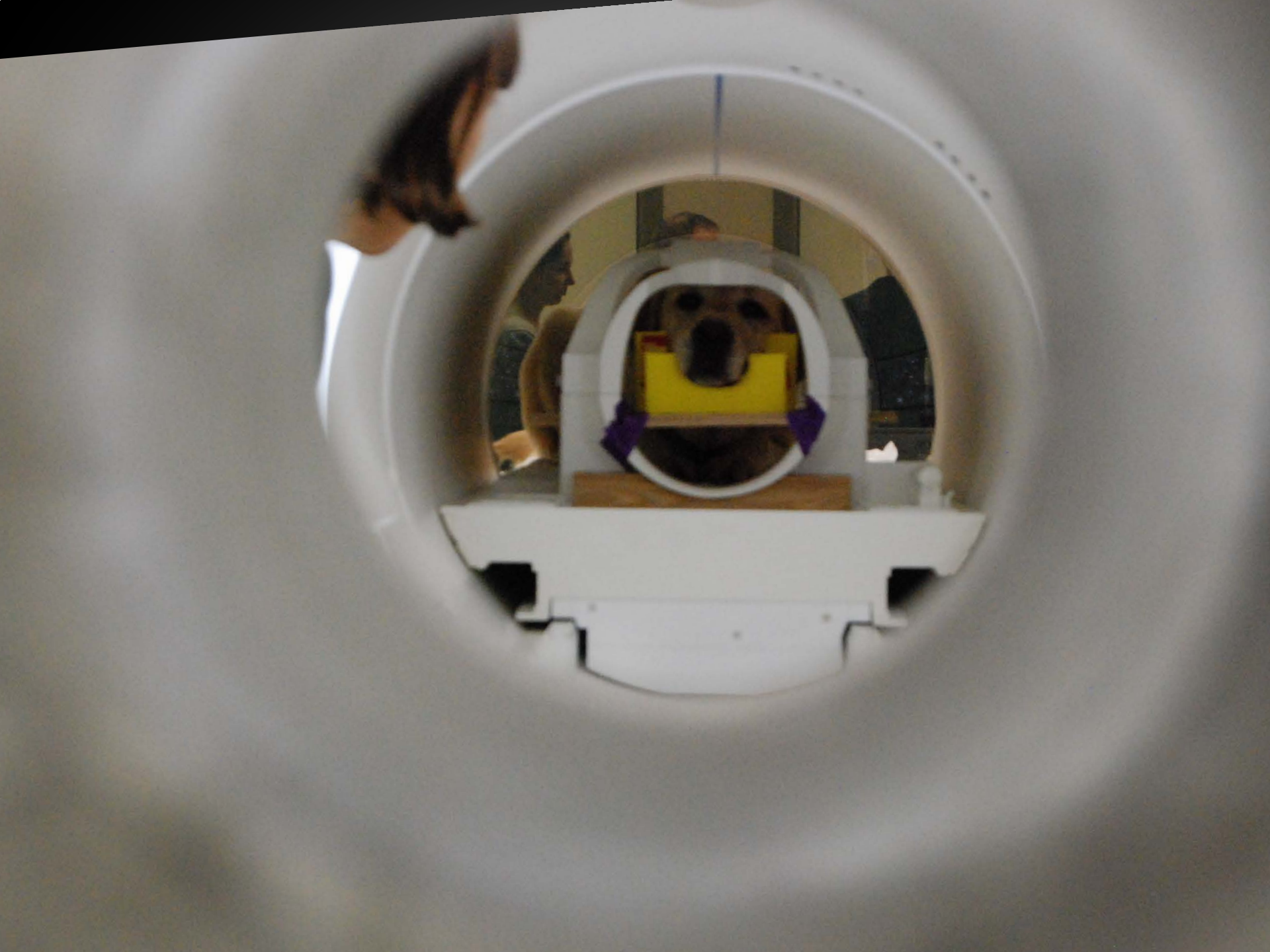


SIEMENS

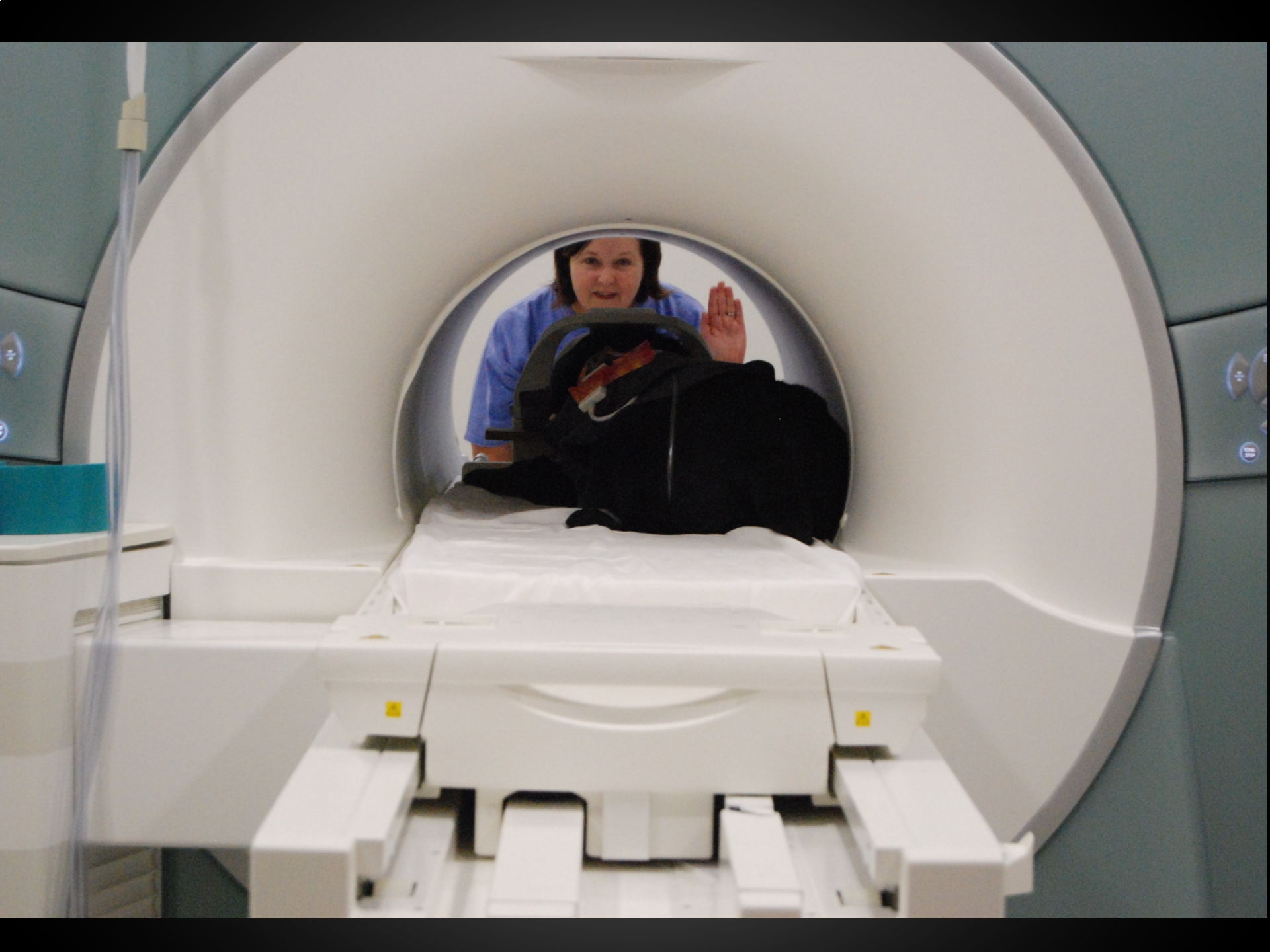
MAGNETOM Trio
A Tim System

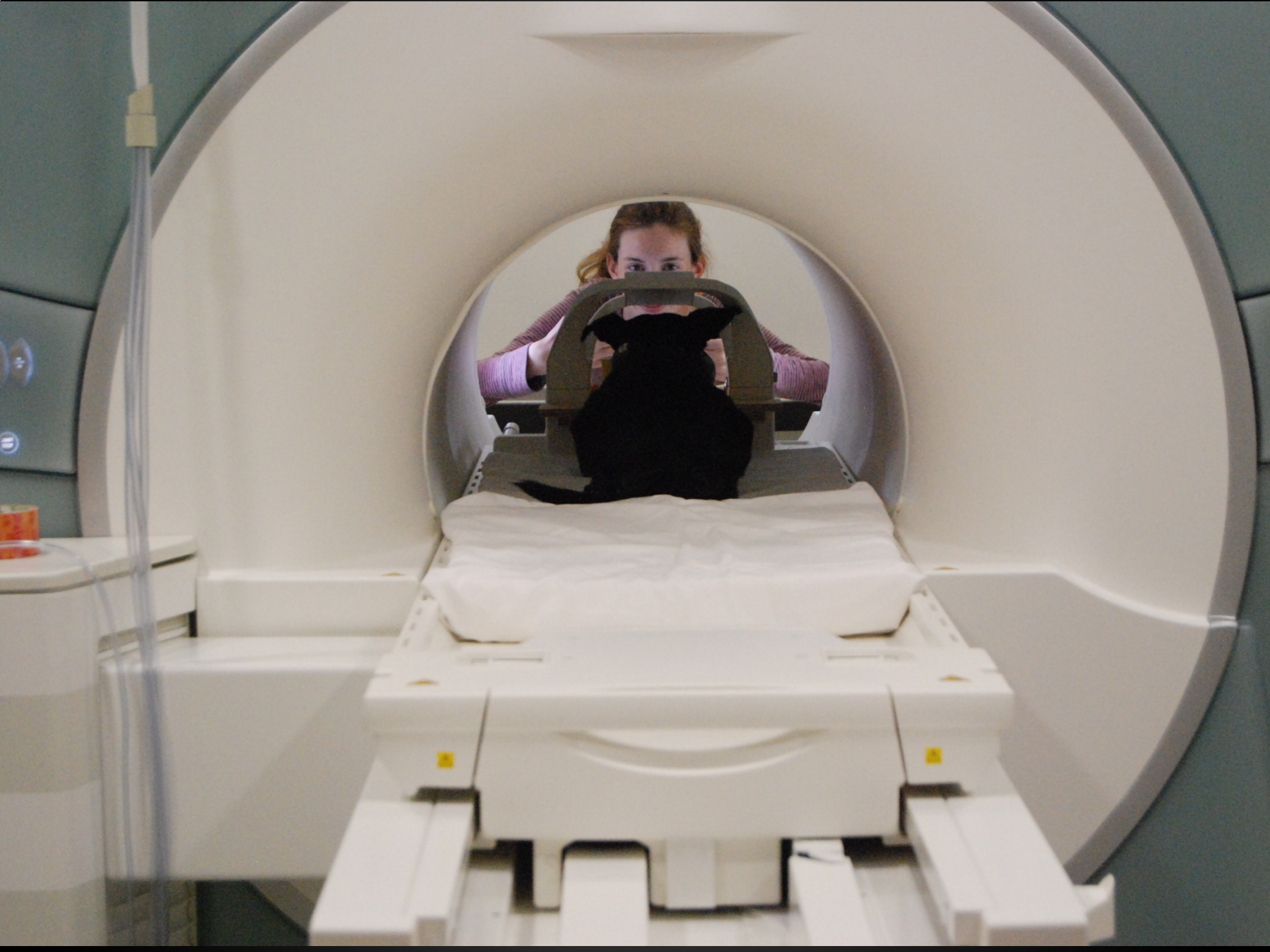






HAND SIGNALS





MRI DOGS!





Zen



Tigger



Pearl



McKenzie



Callie



Kady



Eli



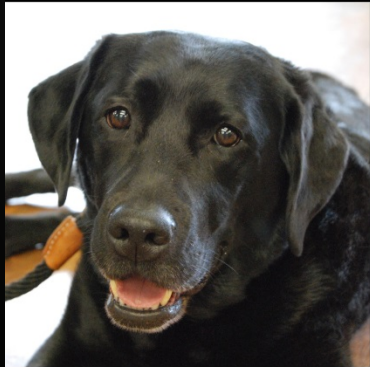
Caylin



Mason



Huxley



Myrtle



Libby



Stella



Jack

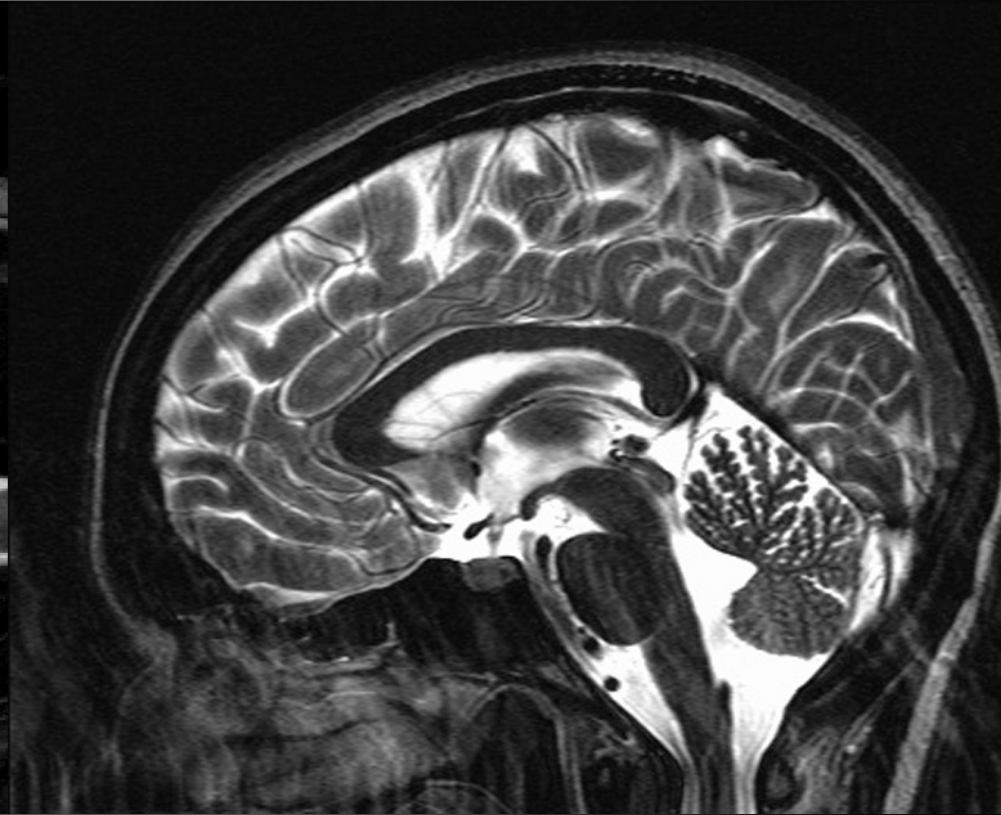


Nelson

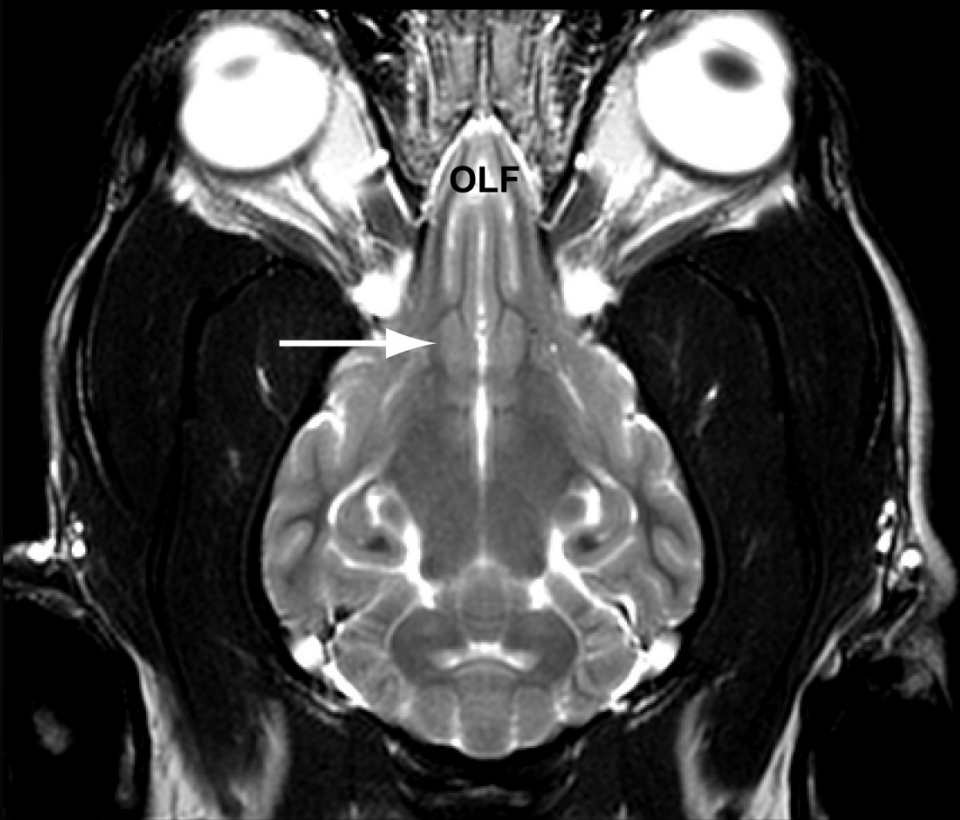
Brain Anatomy



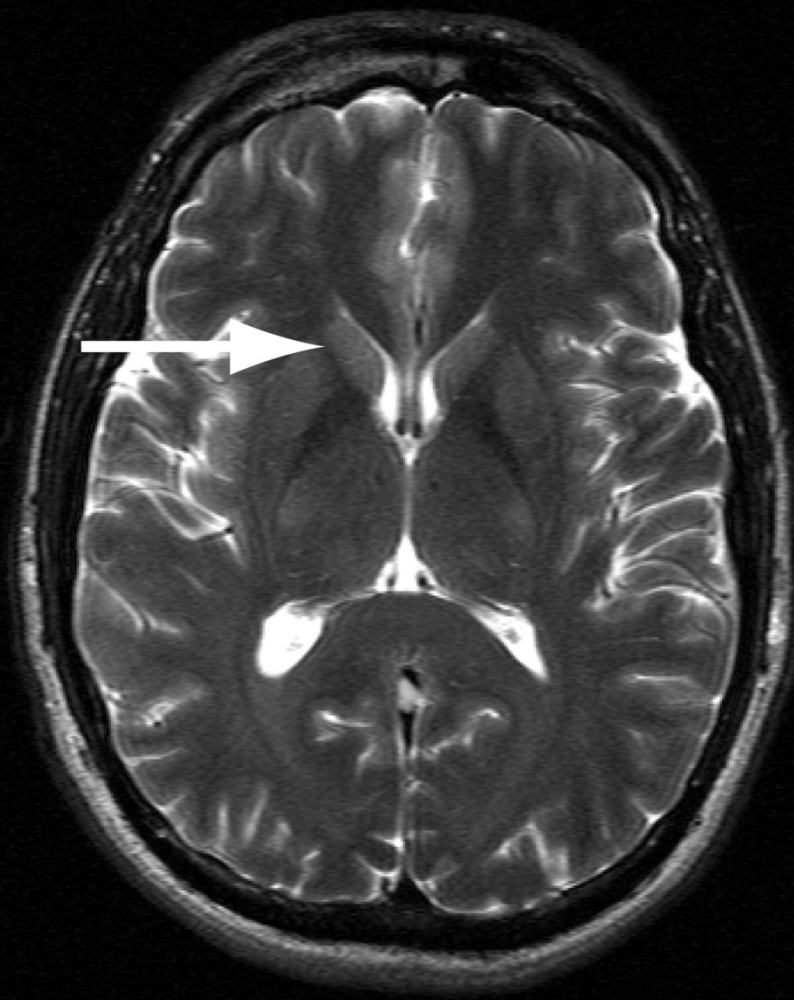
DOG



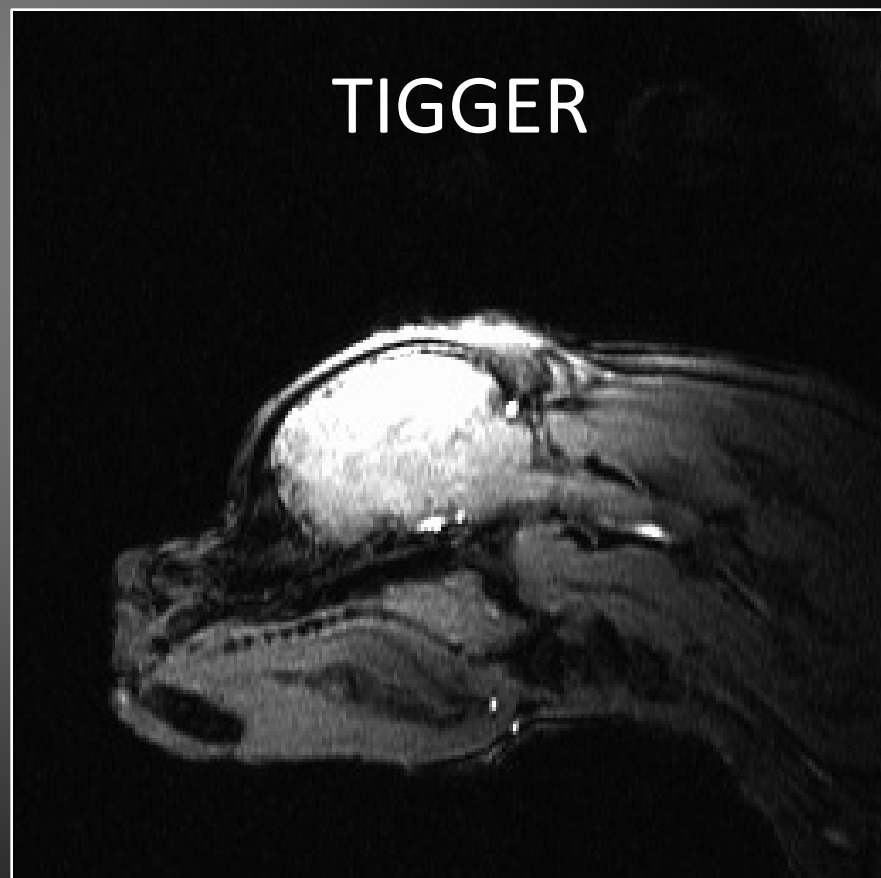
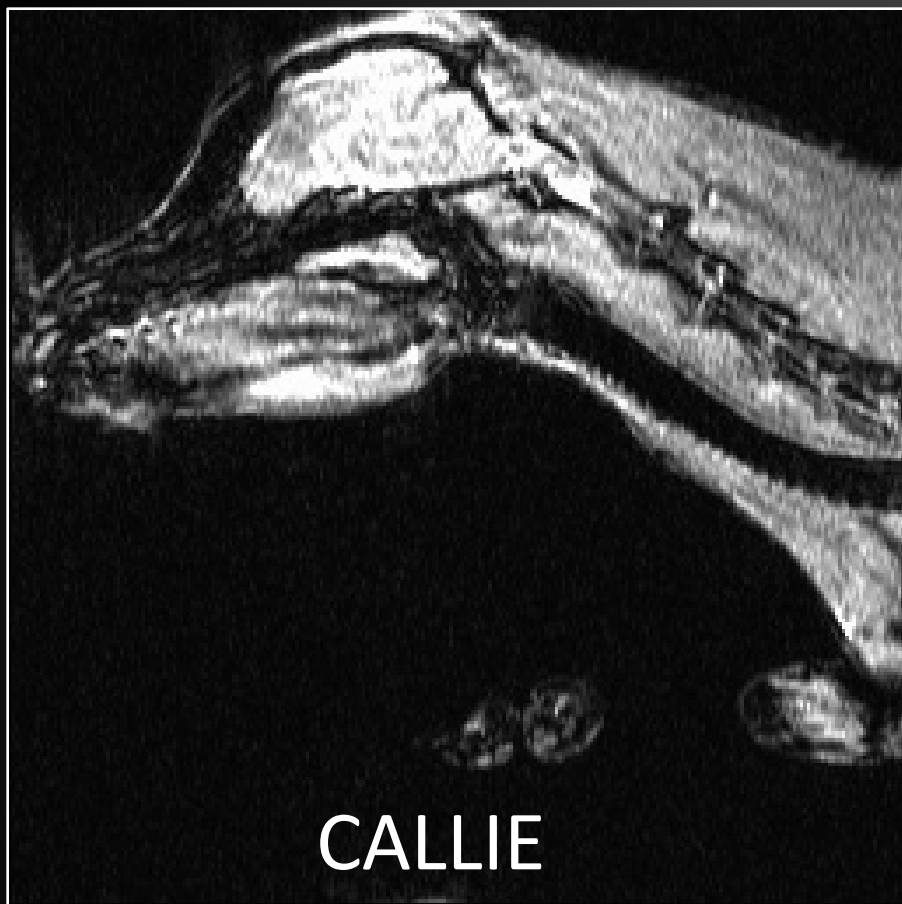
HUMAN



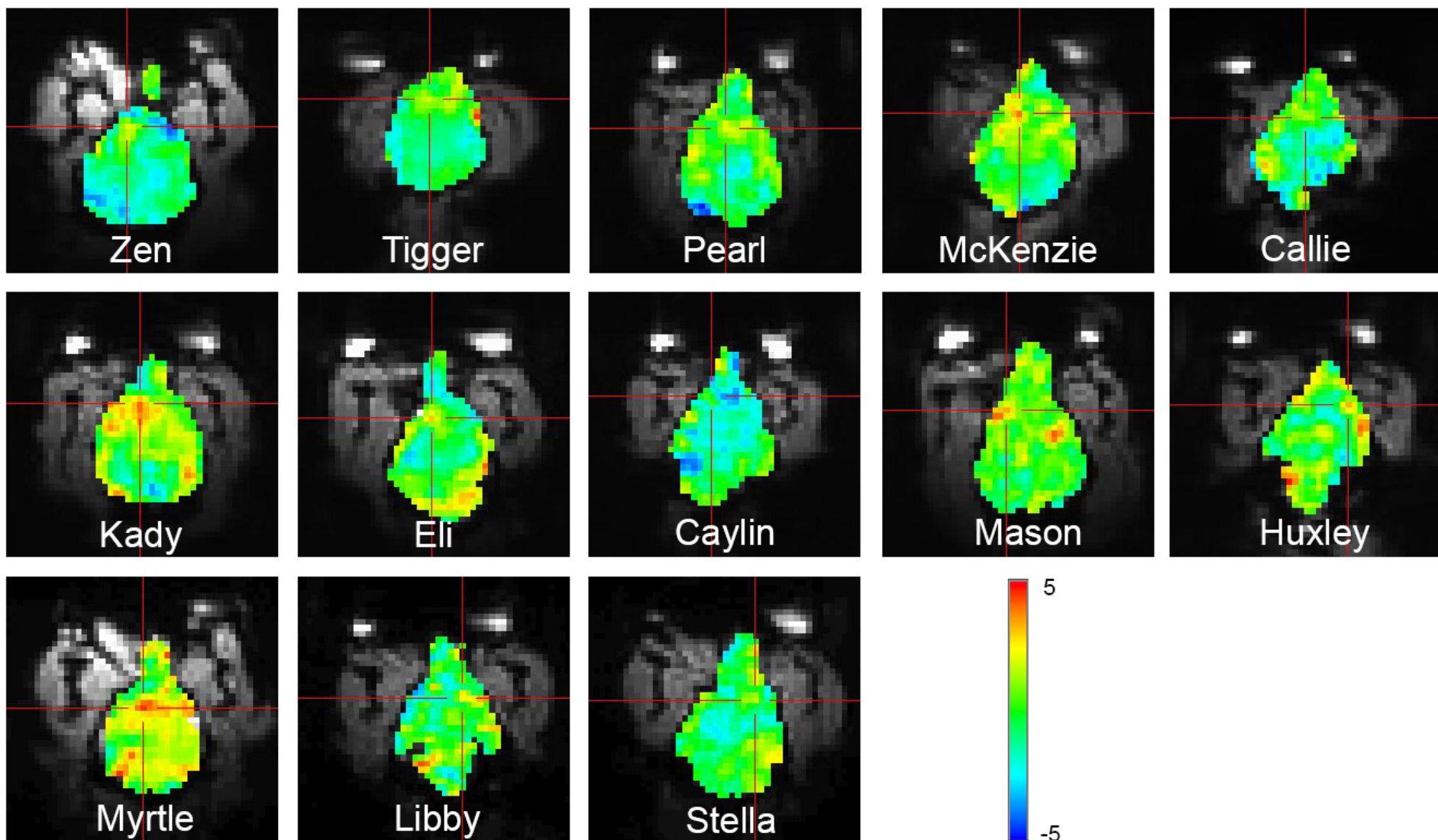
DOG



HUMAN

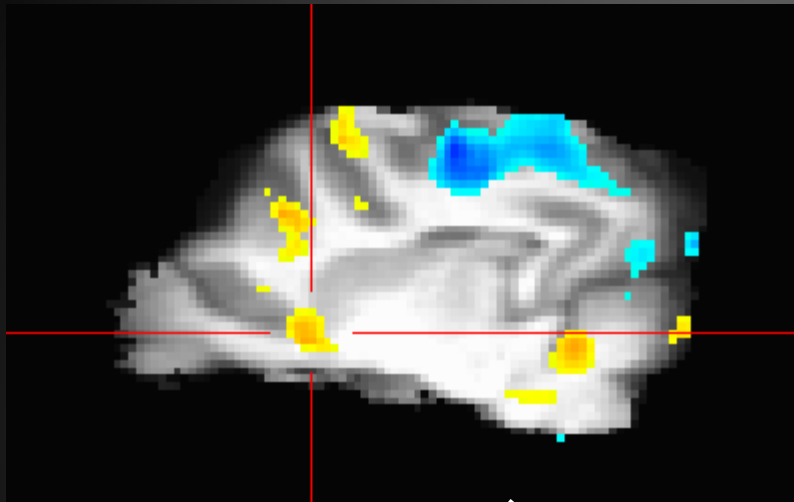


Response to Hand Signals

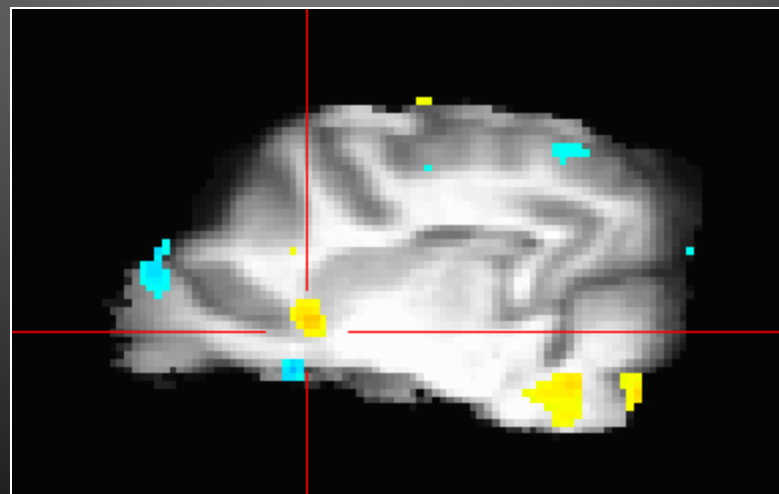
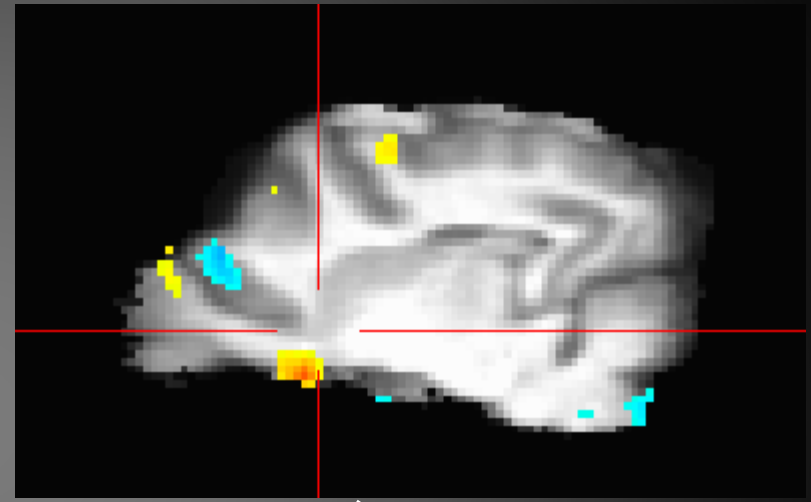


Average Functional Effects

Reward Hand Signal



No-Reward Hand Signal



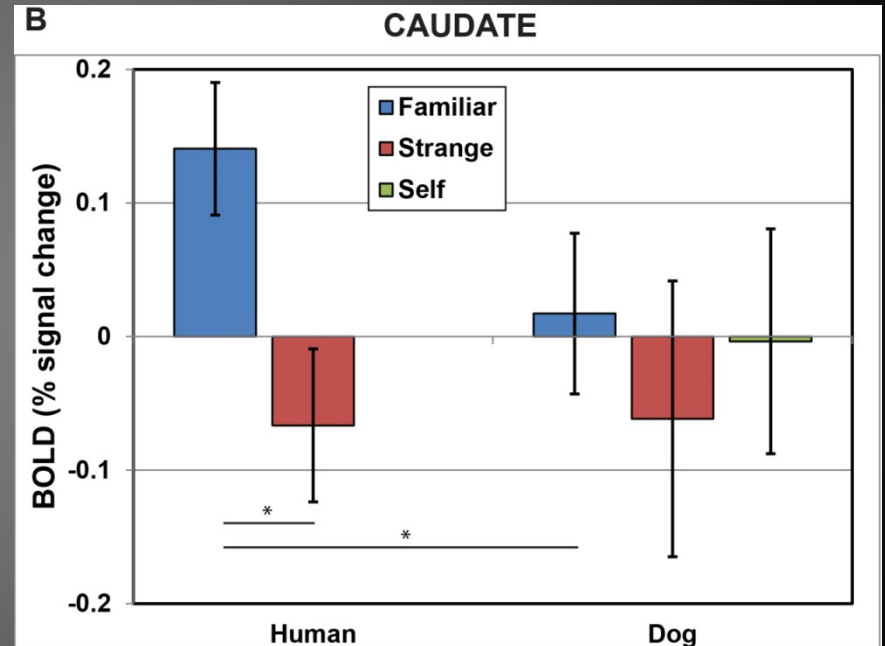
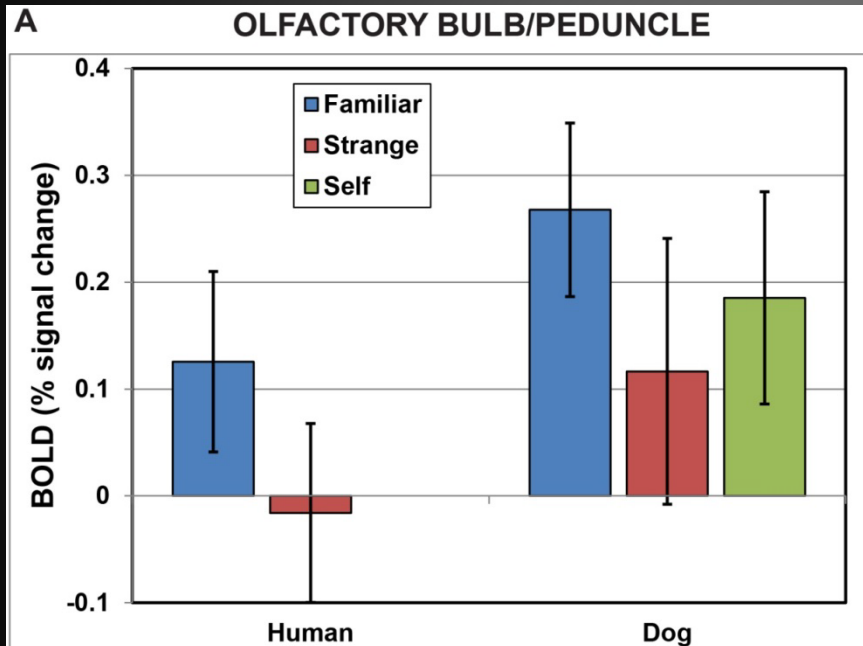
Difference

Biological Odors

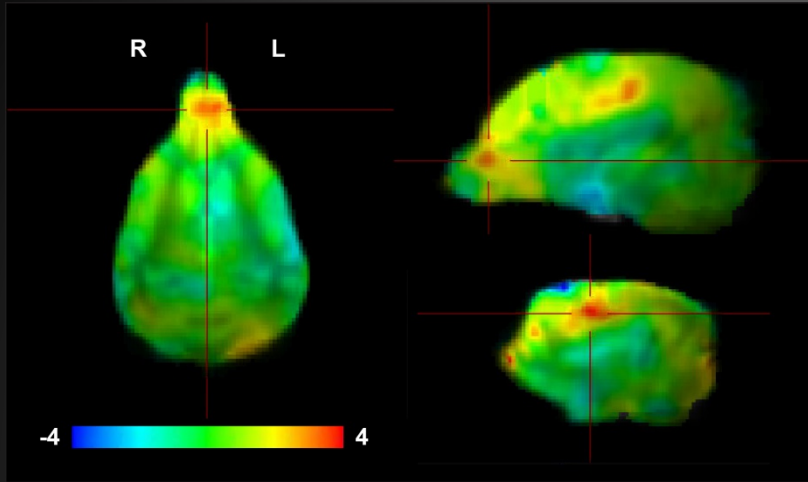


1. Familiar Human
2. Strange Human
3. Familiar Dog
4. Strange Dog
5. Self

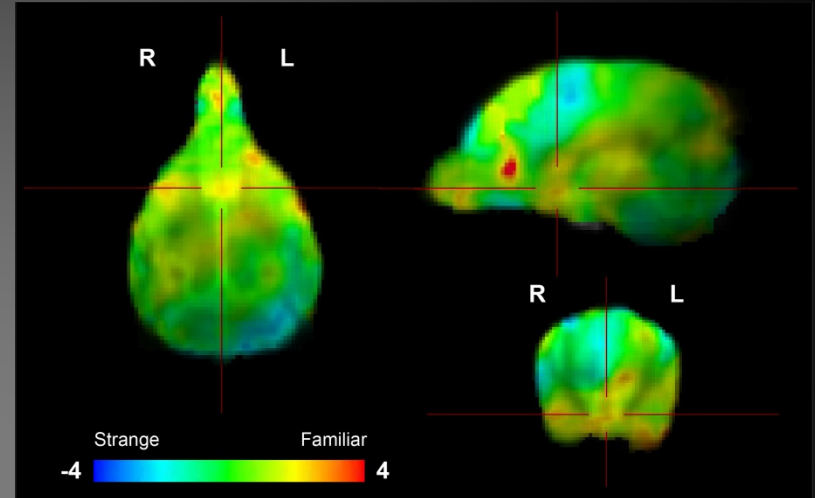
Response to Different Odors



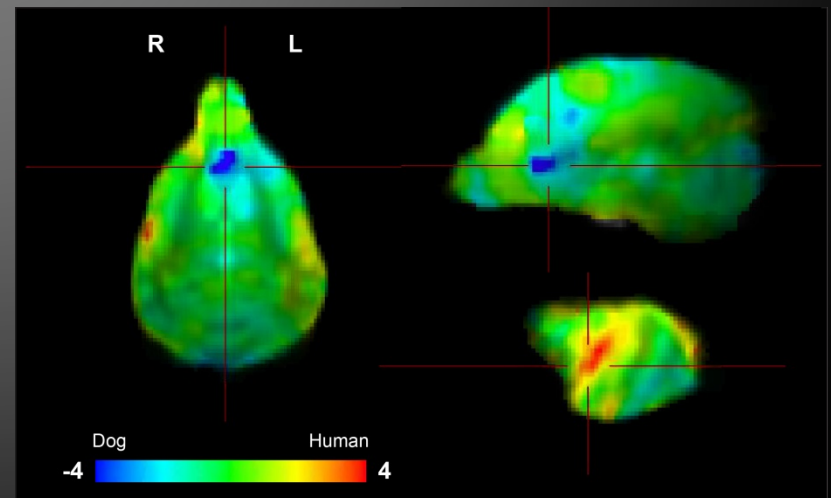
Whole-brain Analysis



All smells



Familiar - Strange



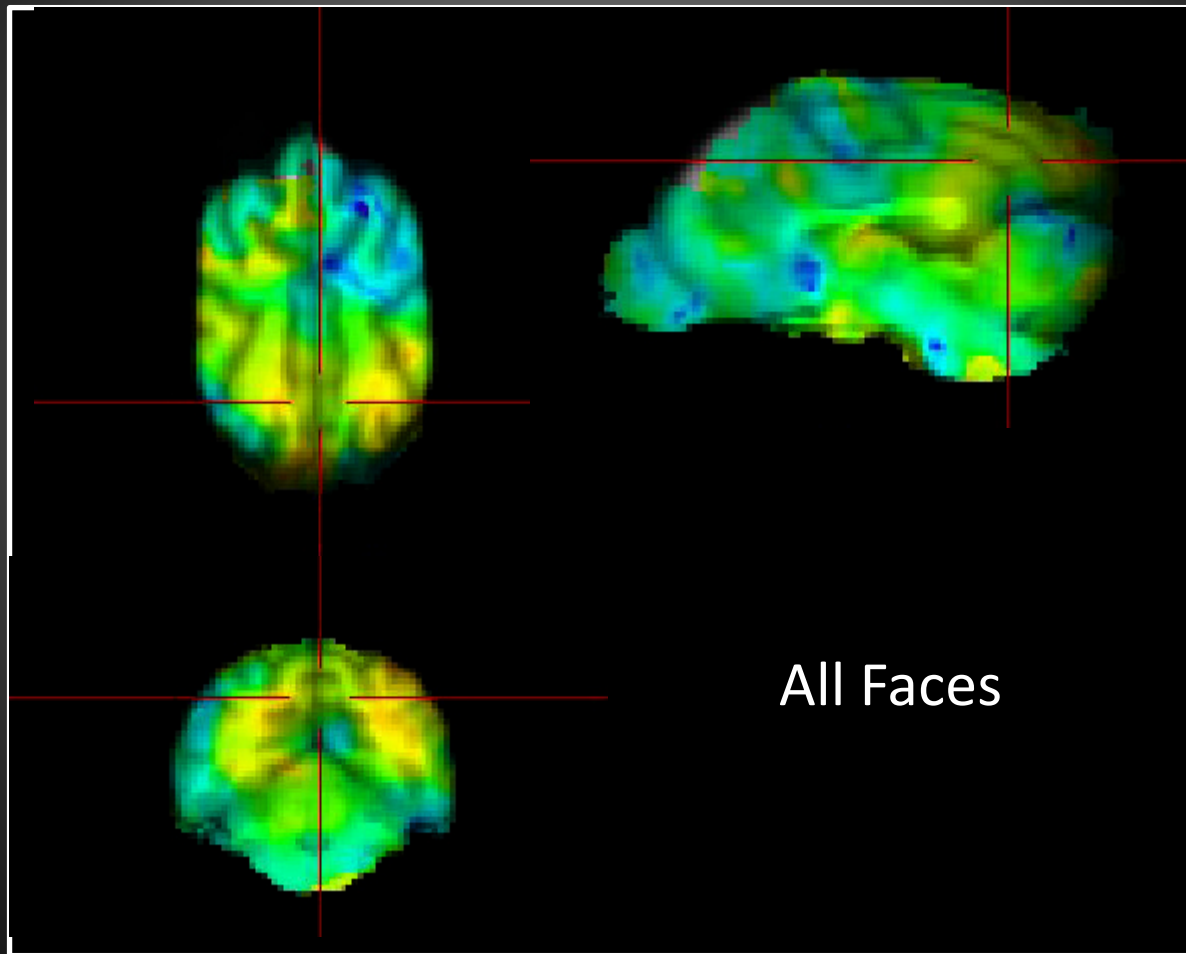
Human - Dog

N=11

Computer Images



Faces



WHAT DOES IT MEAN?



IS IT ALL A SCAM?



Special Thanks

- Mark Spivak
- Andrew Brooks
- Peter Cook
- Helen Berns

The End



Follow The Dog Project: [@gberns](#)