Challenges in Forensic Face Recognition

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Who is this person?

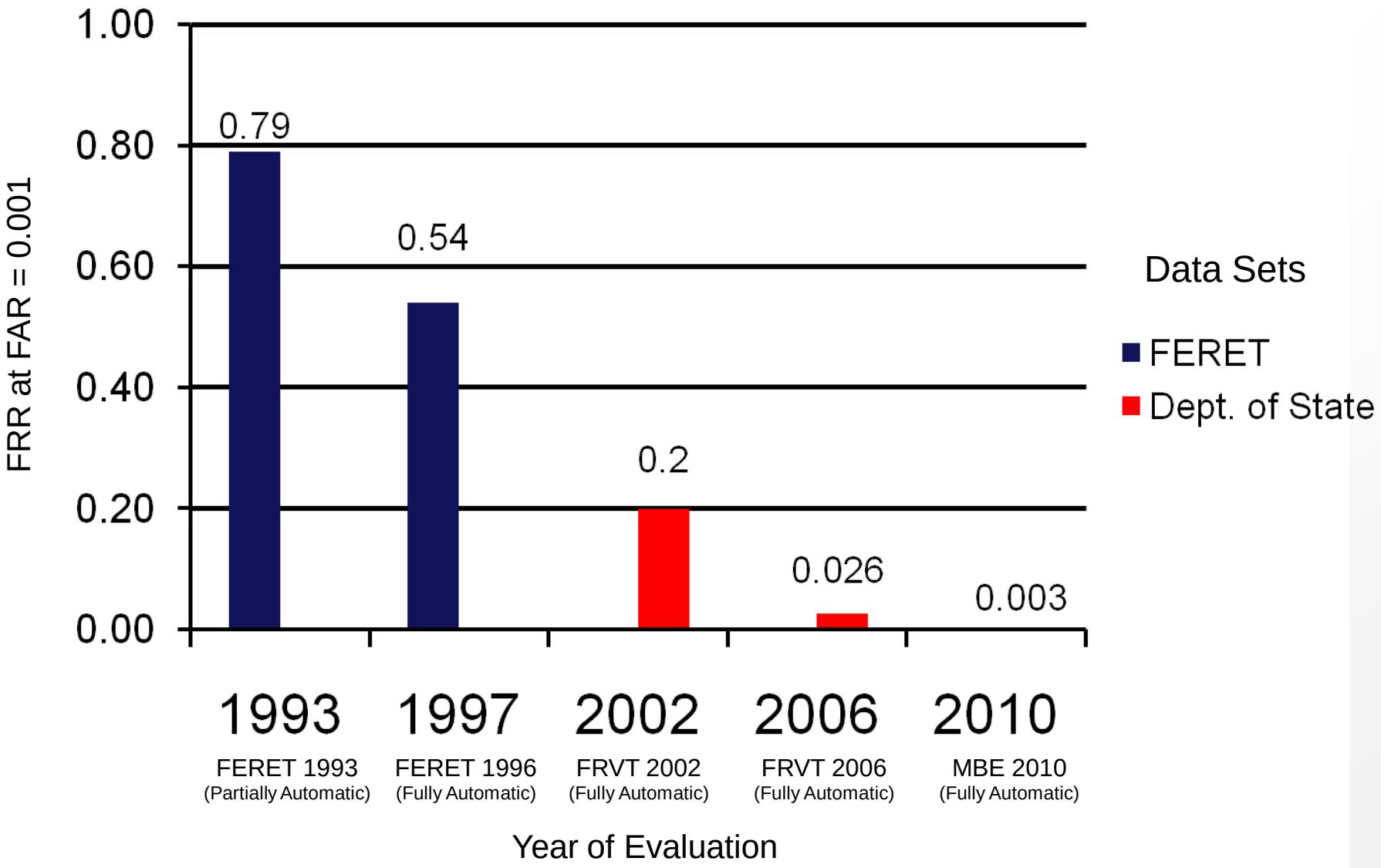
Is this same person?

From FERET to MBE 2010

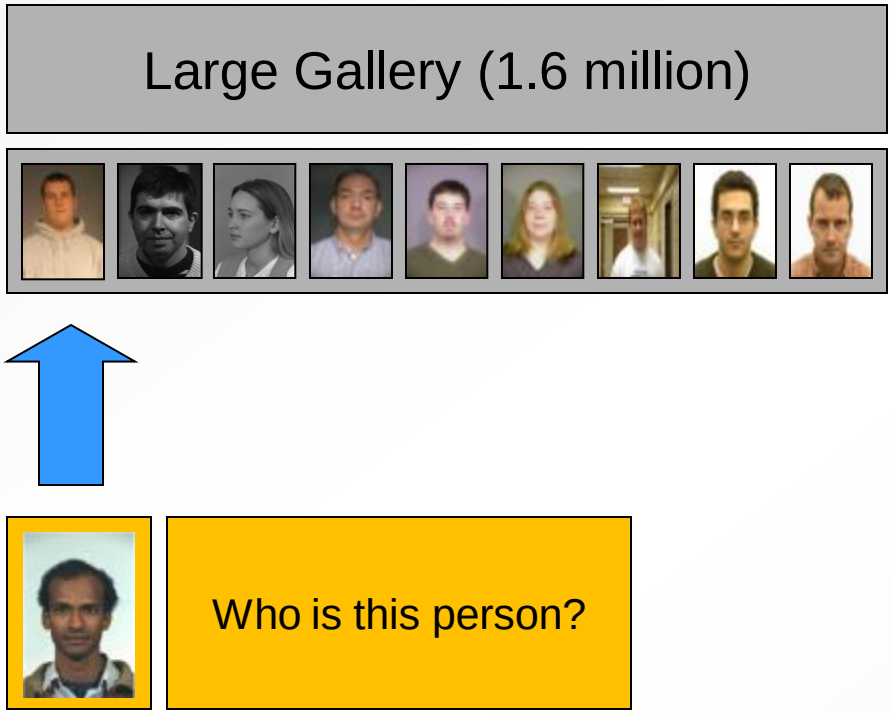
- One Face Image per Person

Problem 1: Controlled Illumination vs. Controlled Illumination

From FERET to MBE 2010

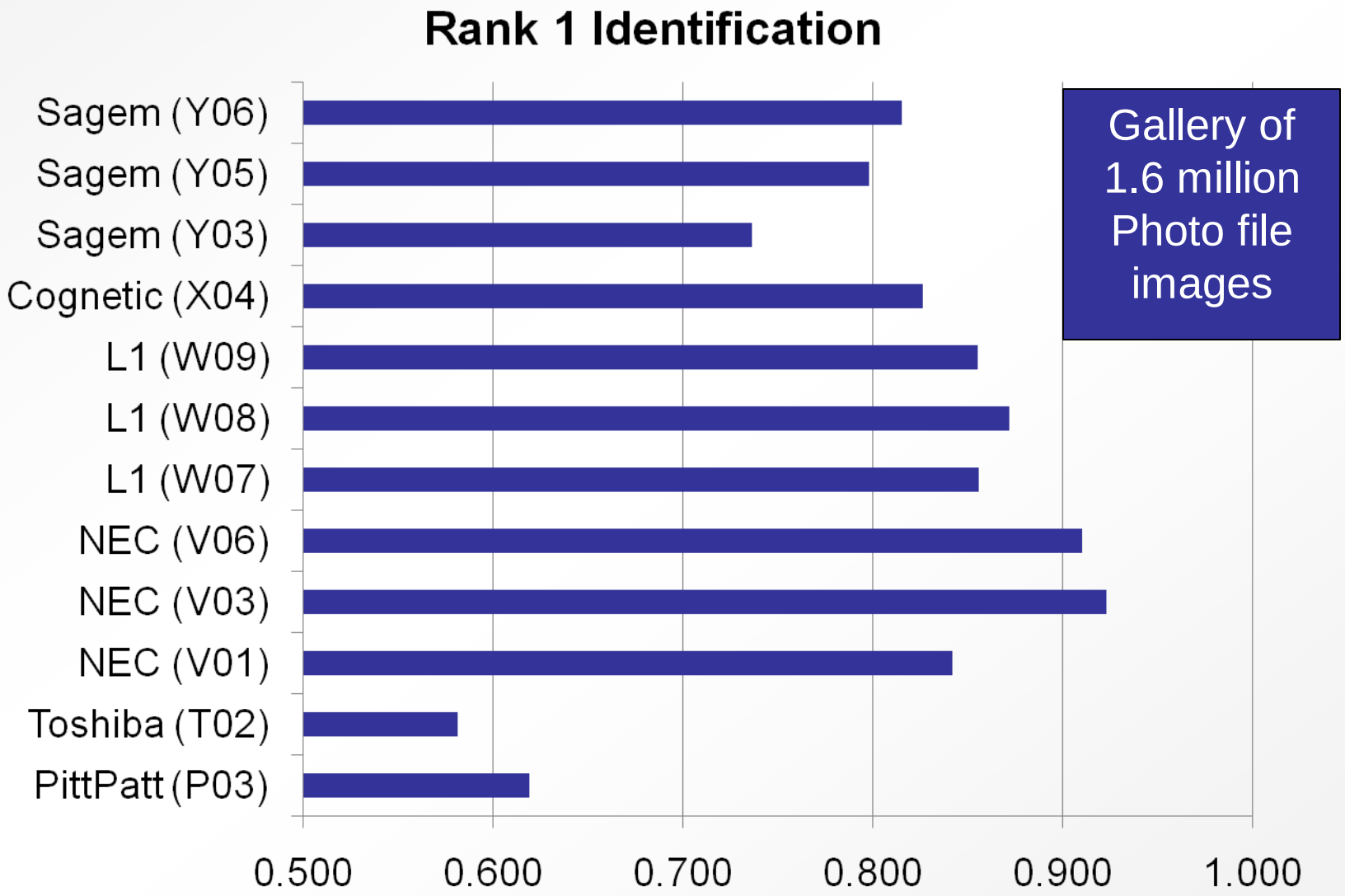


Closed-set Identification

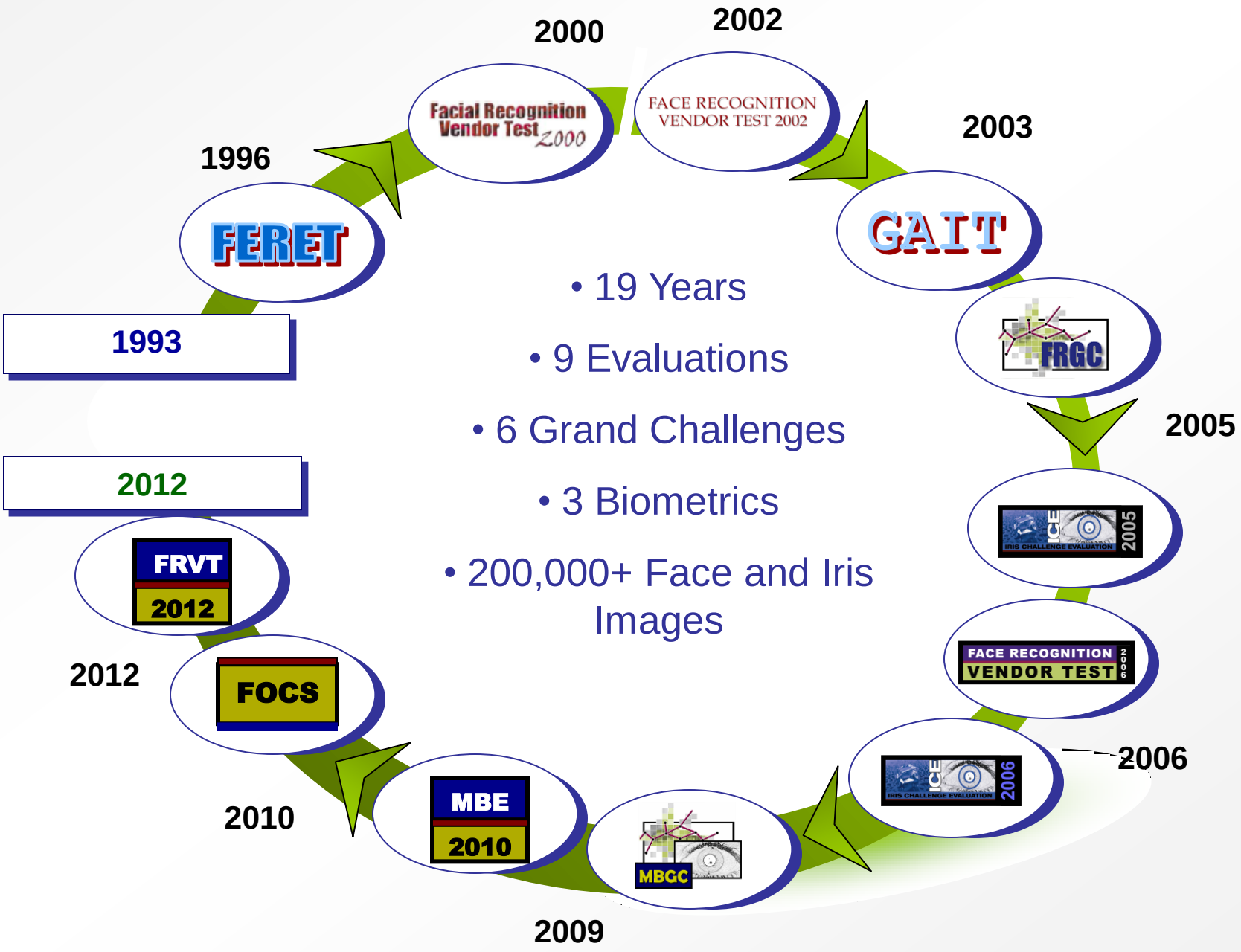


- All probes in gallery
- Score: Rank 1 Identification

MBE 2010 Closed-set Identification



Technology Progress



Ambient Illumination



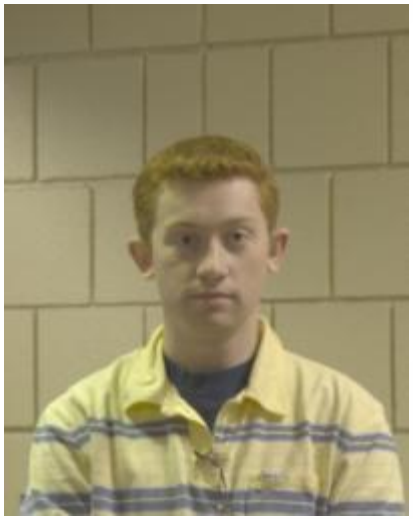



Good

Challenging

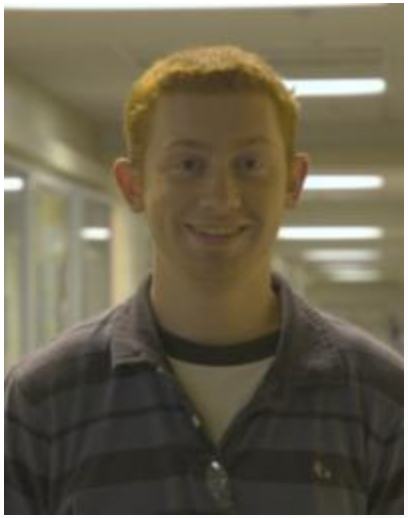
Very Challenging

Face Pairs

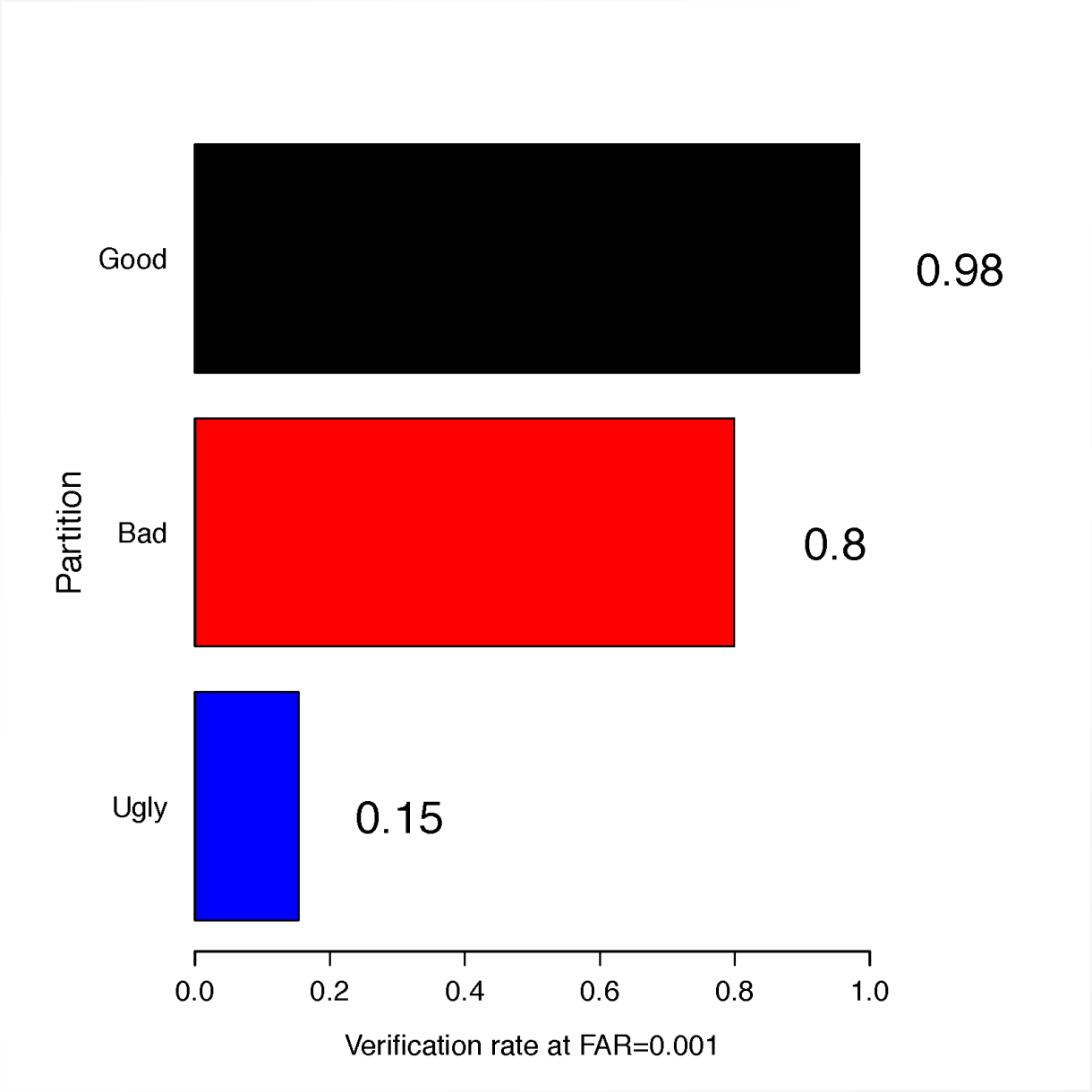
Good


Challenging

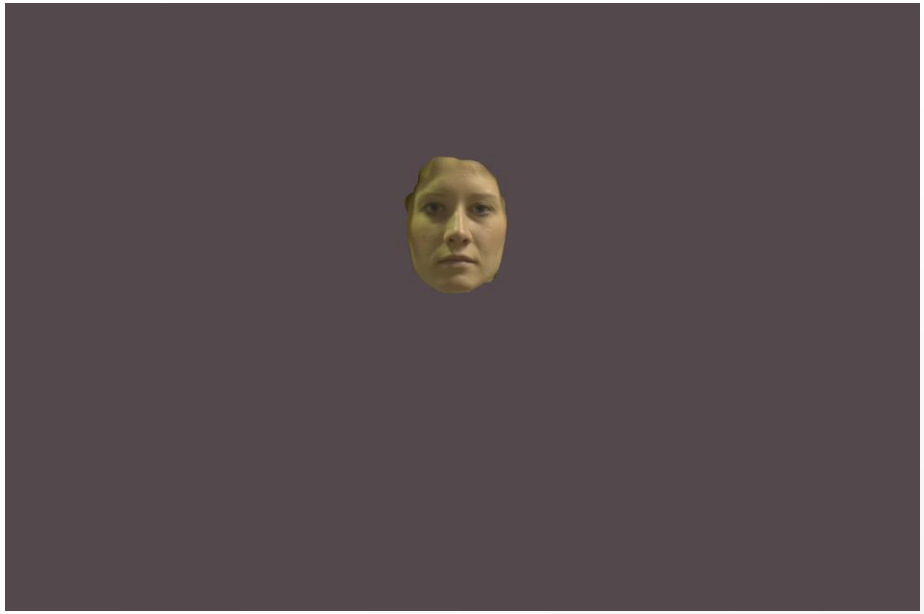



Very Challenging

Good, Bad, Ugly Performance



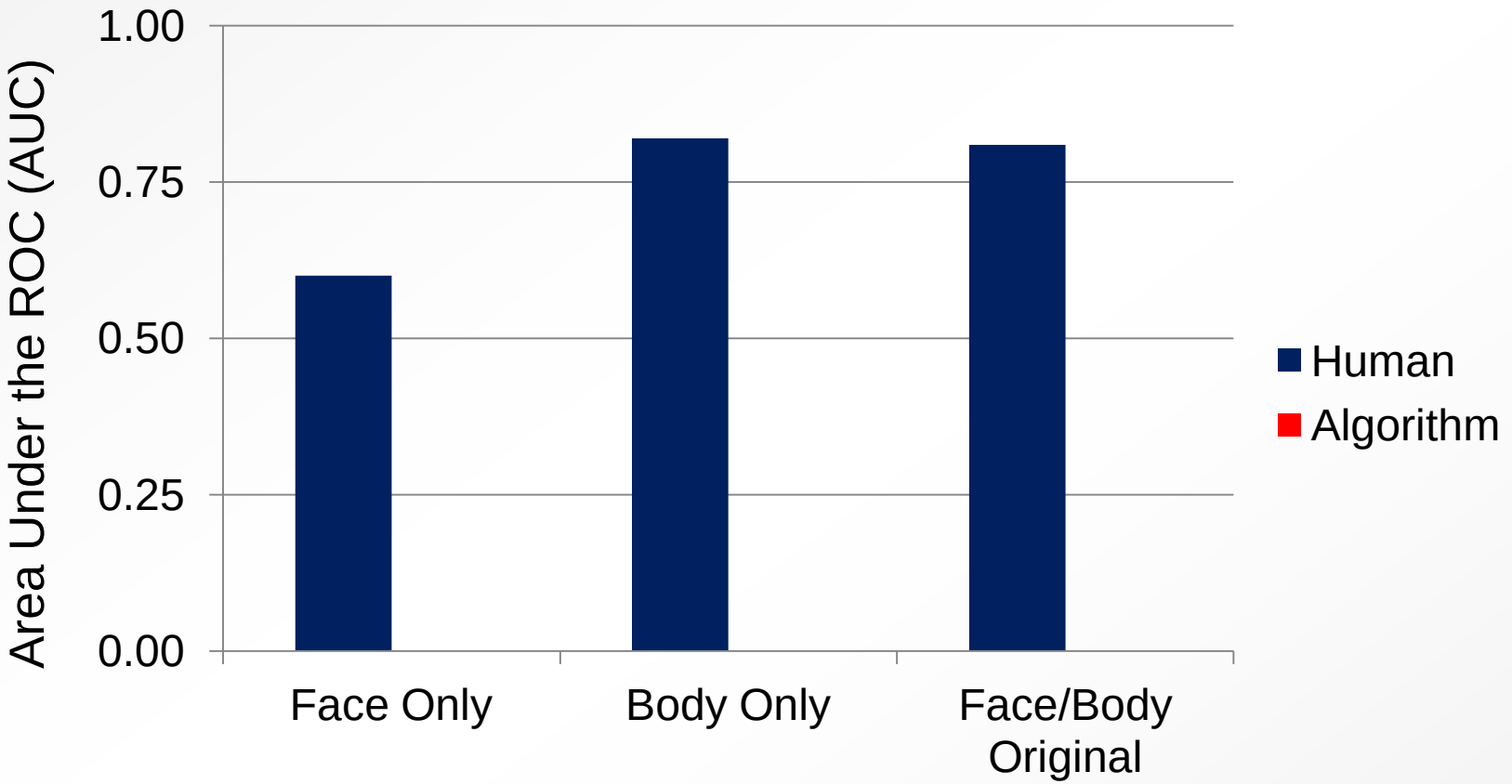
Is this same person?

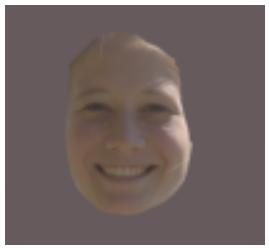


Is this same person?

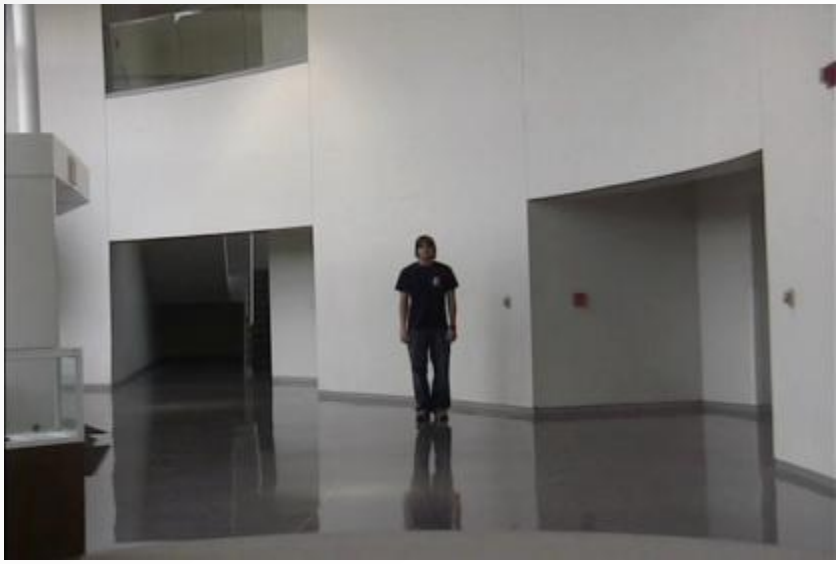
Is this same person?

Reverse ROC Performance





Video

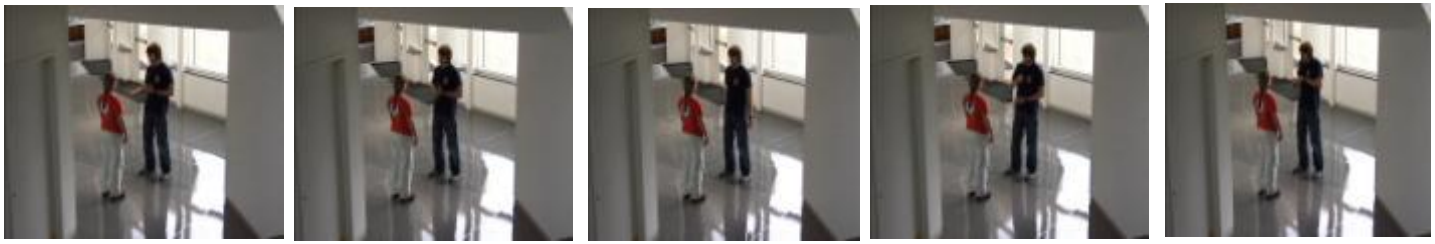


- Motion
- Body and Face
- Cross-pose
- Low resolution

Gait Experiments

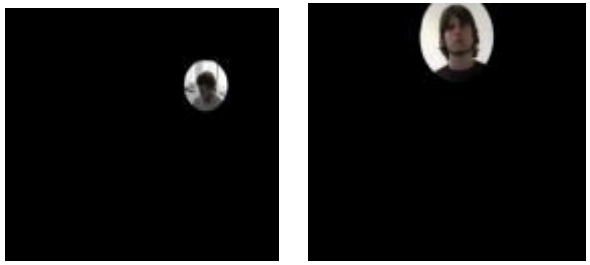
gait video

conversation video



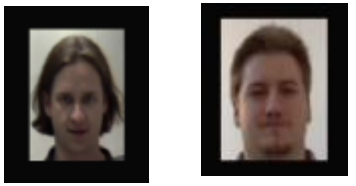
body only

face only

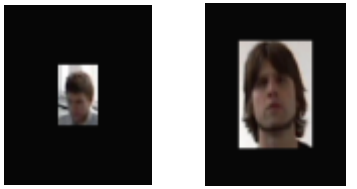


Static Face

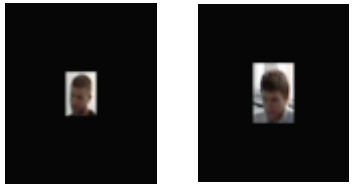
GG



CG



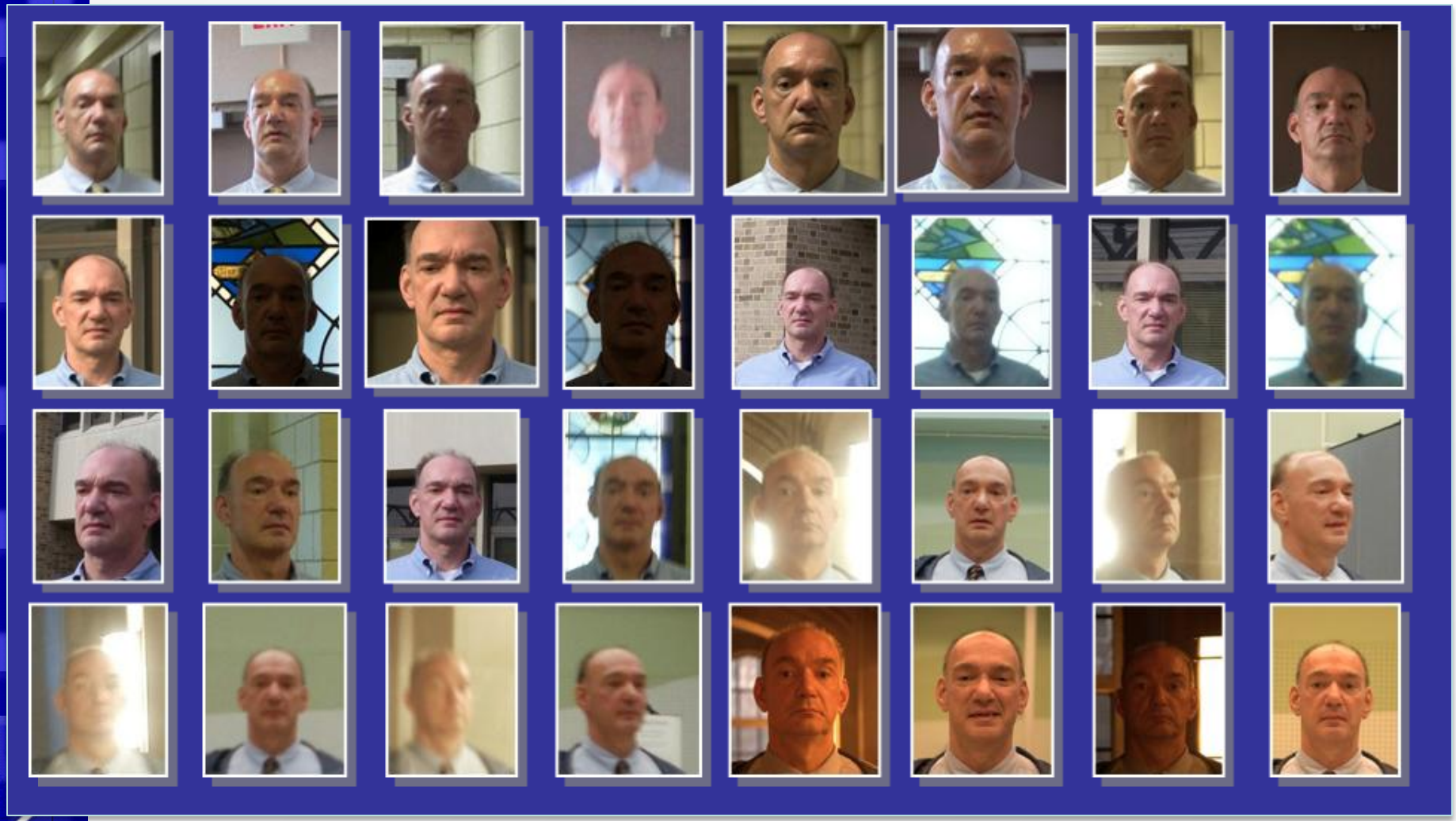
CC



Summary of Video

- In hard cases (poor viewing conditions), humans take advantage of face, body, still, & video
- Evidence: algorithms do NOT take advantage of face, body, still, & video
- Learn from the human visual system.
  - Functional
  - Perceptual
- Incorporate into algorithm design.

Example of Point & Shoot Face Images



Courtesy PittPatt

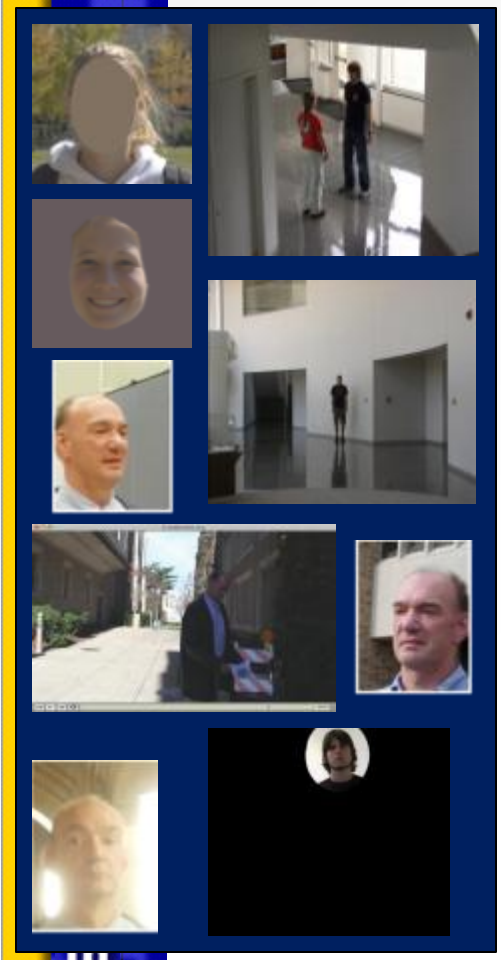
Research direction:

Robust recognition of unfamiliar faces.

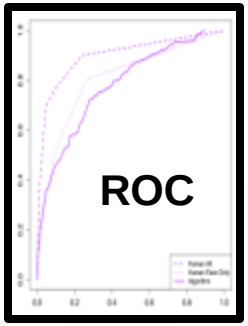
Question:

What is the most *robust* face recognition platform?

The Goal



Algorithm / System



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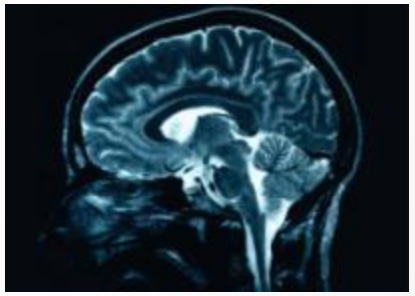

Human and Machine Performance

- Algorithms Better (Normal Humans)
  - Mugshots & Mobile Studio environments
  - Digital Single Lens Reflex
    - Mobile Studio and Ambient Lighting
- Humans Better
  - Non-face identity cues
  - Cross-pose (video—one experiment)
- Not Measured
  - Point and Shot Cameras
  - Change in Pose (in general)

The Challenge

- Problem: Robust Recognition of Unfamiliar Faces
- Imagery
  - Point & Shoot Still
  - Video
  - Unconstrained Environment
- Goal: Human Level Performance
  - Untrained Humans
  - Trained Professionals
  - Forensic Examiners

Questions?